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Donna Pendergast

Publication in IJHE provides wide exposure to journal articles and adds to the professional literature base of the field. Theoretical papers, literature reviews, and a wide range of genres along with research papers are invited for publication in the journal. As editor, I strongly encourage submissions to the journal. The papers included in this issue of the journal represent a diverse range of contexts. Twelve of the thirteen papers are refereed papers that were presented at the XX111 IFHE World Congress held in Korea in August 2016. The theme of the Congress was: Hope & Happiness: The role of Home Economics in the pursuit of hope & happiness for individuals and communities now and in the future. The next issue of the IJHE will also feature congress papers.

Professor Donna Pendergast, PhD
Editor, IJHE

Acquisition of basic tailoring skills: implications for well being of beneficiaries of school-on-wheels (SOW) programme of national directorate of employment in Nigeria

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Abstract

Unemployment and poverty are serious challenges in Nigeria. Consequently, Nigerian government established School-on-Wheels (SOW) as a poverty alleviation programme to abate the challenges. SOW equips unemployed people with vocational skills in many occupational trades including in tailoring as means of earning income to improve their well-being. After over 22 years of implementing SOW in Anambra State of Nigeria, unemployment is still high and many people are poor in the state. This questions the efficacy of the programme. The study thus determined; tailoring competencies acquired by beneficiaries of SOW, the income earning status of tailors that participated in SOW programme including its contribution to their well-being. Data were collected using questionnaire and a focus group discussion guide. SOW provided beneficiaries with five basic tailoring skills that included: measurement taking, sewing of straight line stitches, care and storage of facilities ($\bar{x} \geq 2.50$) out of twelve. Their acquired skills were not enough for them to be in employment without further training as 22% of the beneficiaries that did not afford further training after six months of SOW's training remained unemployed in tailoring occupation because of lack of sufficient skills. Eighty percent that went for further training possessed sufficient skills and are in tailoring employment with improved well-being. In conclusion, SOW provided very limited tailoring skills but indirectly brought about improved well-being for beneficiaries that continued in tailoring occupational trade. Two years minimum training duration, adequate funding, effective monitoring and evaluation of SOW programme including follow-up of its beneficiaries was recommended.

Introduction

School-on-Wheels (SOW) tailoring training is an integral part of National Directorate of Employment (NDE) programmes. It was designed to equip interested unemployed people with clothing construction skills in 36 states that make up Federal Republic of Nigeria including Anambra State. SOW uses informal sector owners of tailoring workshops to train beneficiaries on tailoring among others in Anambra State (NDE 2003). Official records from Anambra State Office of NDE shows that 328 people called beneficiaries have been trained on basic tailoring otherwise called fashion design under SOW between 1991 and 2013. The beneficiaries ought to be in tailoring employment as well as be earning income with improved well-being in tailoring occupation. Unfortunately, it appears the beneficiaries are still unemployed and poor. The National Bureau of Statistics (NBS) (2010) stated that Anambra State has unemployment rate of 21.3%, which is more than the national average of 21%. Anambra State

Ministry of Youth and Sports (2012) also reported that 6,234 youths registered as unemployed persons in 2011. Earlier, NBS (2006) had reported that 74% of the households in the state are poor with 37.4% of them having difficulties in meeting their basic needs of food, shelter, clothing and education. The NBS further explained that 36.6% and 41.3% of rural households in the state do not have access to secondary education and health care services respectively for their children in 2006. Similarly, European-Support to Reforming Institutions Programme (SRIP), (2009) stated that 85.3% of rural households in Anambra State are living in different categories of poverty of which 32% are living in extreme poverty condition of not being able to meet their basic physiological, security and social inclusion needs. These revelations question the efficacy of the SOW programme hence this study that aims at ascertaining how tailoring skills possessed under the programme is contributing to the well-being of its beneficiaries.

Tailoring or clothing construction requires competency in associated tasks. Competency depicts a standardized skill or set of skills acquired by individuals for effective performance of specific occupational tasks (Onu and Ochiaka, 2011) such as seen in tailoring occupation. Tailors trained under SOW scheme should possess competency in performance of various basic tailoring tasks. Tailoring tasks have been listed as; taking of body measurement and recording, pattern drafting, cutting, stitching or joining of cut pieces of fabric by both hand and different types of sewing machine in sewing all types of well-fitting and comfortable garments for the public. Others include: identification of basic sewing tools and equipment; their uses, care and safety practices including management of tailoring enterprises (NDE Training Manual on Fashion Design Trade, 2006). Trained tailor beneficiaries of SOW are expected to possess these skills and apply them in sewing fitting and well-finished trousers, shirts, skirts, blouses and gowns to the satisfaction of their customers.

Satisfaction in this context is a measure of sewing competency of tailors that meet the expectations of customers that patronize their services. Adebeisi, and Ukpore, (2014) stated that customers in southwestern Nigeria found very satisfactory services of tailors trained under National Poverty Eradication Programme–Capacity Acquisition Scheme (NAPEP-CAS). This is because beneficiaries of the programme were able to acquire all the needed tailoring skills that enabled them to sew well-fitting dresses that resulted in their earning enough income through tailoring services. In contrast, Amubode & Folade, (2012) found that most Nigerian tailors lack skills to sew well-fitting and neat garments to the dismay of their customers. Similarly, Okeke (2004) noted that graduates of home economics lack basic tailoring skills which agree with findings of Abiamunwue, Seriki–Mosadolorun, & Lemon (2014). The authors observed that most tertiary level graduates of clothing and textile course of study could not draft, cut and sew good garments without assistance. In the same vein, Naijarules (2011) reported that most Nigerian tailors lack creativity needed to make their services professional and lamented over huge economic waste it portends to Nigeria because of importation of costly better sewn ready-to-wear garments that becomes the alternative. Importation of foreign ready-to-wear garments could; diminish income of local Nigerian tailors, cause under-employment and unemployment of for most of the tailors.

Income is money earned from investments as a result of doing a paid work. The Nigerian Educational Research and Development Council (NERDC) (1990) defined income as an amount

of gain or benefit received in a period of time for services rendered. Incomes are earned and used to improve well-being that translates to alleviation of poverty

Poverty has multidimensional connotations. The NBS (2010) defined poverty based on availability of basic needs of: food, clothing, shelter, sanitation facilities, pipe-borne water, education, good healthcare and access to information. Poverty has three different degrees of lack that are relative, moderate and extreme in nature (Sachs, 2005). According to Sachs relative poverty is constructed based on household income level below a given proportion of average national income. The author posited that the relative poor have comfortably met their basic needs in high-income countries and lack only access to higher order needs such as; access to entertainment, recreation and other prerequisites for upward social mobility. The moderate poor live in conditions in which their basic needs are barely met and the extreme poor live on a level of battling with meeting their basic physiological needs of food, clothing and shelter. Implicit is that there is correlation between levels of earned income and level of expenditure that mirrors well-being. In effect, increase in income earnings of individuals, including those SOW trained tailors in employment, would increase their expenditure, vis-à-vis their well-being through more needs satisfaction. Satisfaction of needs would follow hierarchical order meaning that basic needs would first be met before others as theorized by Maslow (1954). Implicit is that one's state of well-being is a function of level of income and the purchasing power it attracts that equally is applicable to beneficiaries of SOW in tailoring employment. .

Statistically, NBS uses income based approach to determine poverty levels in Nigeria. The approach is based on a formula which when applied on per capita minimum income of ₦ 226, 920.19 for Nigerians (National Planning Commission, (NPC), 2011) gives income earnings that are categorized into; extreme, moderate and relative poverty levels. The NBS (2007) formula stipulates that: 1/3 of the per capita income, between 1/3 and 2/3 of the per capita income and above 2/3 of the per capita income up to approximately ₦ 226, 920.00 (₦ 150 =1 USA dollar) belong to the categories of the; extreme poor, moderate poor and relative poor respectively in Nigeria. Per capita income earning that is equal or above the ₦ 226, 920.19 (i.e. approximately ₦ 227, 000) minimum wages belong to non-poor that are in different categories of middle and high level income earners in Nigeria. Based on this, per capita income earnings approximately; below or equals ₦ 76, 000, between ₦ 77, 000 and ₦ 151, 000 and between ₦ 152, 000.00 and ₦ 226, 920 are for the; extreme poor, moderate poor and relative poor respectively in Nigeria based on the 2011 per capita expenditure. It also means that per capita income earnings above ₦ 226, 920 would be seen as belonging to the non-poor who are in categories of middle and high level income earners in Nigeria. The NBS (2007) further explained that the extreme poor spend around 51% and 49% of their income on food and basic non-food materials respectively, while the moderate poor spend around 42% and 58% of their income on item lines of food and basic non-food items respectively. This is to say that the extreme poor spend most of their income in meeting their basic needs of food, clothing and shelter and have little or nothing for acquisition of assets for upward social mobility. This falls in line with Maslow's theory of needs satisfaction that is tangent on availability of resources such as earned income from employment. Paradoxically, Eze-Uzoamaka (2013) posited that some people may be in employment and stills earn income

that falls short of meeting their basic needs that ripples into poor state of well-being. Well-being has many connotations.

Well-being means that all aspects of environment, body, mind and spirit of individual human being are harmonized and satisfied to the fullest extent (Lee & Sirgy, 2005 as quoted in Son 2015). Money resource in form of income has great role to play in meeting needs and bringing satisfaction and happiness in the lives of individuals and their homes. Higher amount of earned income can contribute to leveraging of needs, improved quality of life, life style, and high level of satisfaction or happiness of individuals in employment even as the opposite holds when the reverse is the case which agrees with findings of Madi (2007). According to the author, 22% of beneficiaries of an Indian poverty alleviation project admitted that the programme did not improve their well-being at all while 44% indicated that even though the project helped them to generate more income, that the income was not enough for them to meet their basic needs. This means that earning higher income correlates positively with higher well-being, satisfaction of needs and happiness. Similarly, Adaigho, and Izeke, (2009), Offing and Daniel (2010) and Enema, Ugbomhe and Dirisu (2010) found that because income earnings of small business operators in most rural dwellers were very low, that they were unable to take good care of their children's education, clothing, house repair and food provisioning needs. The implication is that low income earning means; poverty, poor living standard and lack of well-being and happiness. In addition, Enoma, Ugbomhe and Dirisu (2010); Adaigho, and Izeke, (2009) revealed that most business operators in rural settings could not expand their businesses because their meager earnings were not enough in meeting basic needs let alone embarking on savings for use in expanding their businesses or for unexpected. Whether this is the lot of beneficiaries of SOW scheme in tailoring employment is unknown hence this study. The study would elucidate on the efficacy of the scheme in alleviating poverty and contributing to well-being of its beneficiaries.

Research Questions

1. What tailoring competencies are acquired by beneficiaries of SOW scheme trained on tailoring trade occupation?
2. What are the income earning levels of practicing tailors that participated in scheme's tailoring training that are in employment in the occupation?
3. What is well- being status of beneficiaries of SOW scheme in tailoring employment based on their expenditure pattern?

Hypothesis

The study tested one null hypothesis that stated that there is no significant difference in well- being of beneficiaries of the SOW that are employees and self-employed individuals in tailoring occupation based on their level of expenditure

Methodology

The study adopted descriptive survey research design and was carried out in Anambra State. Anambra State is in south eastern Nigeria and has a population of 4,055,048 people that comprises of Igbo ethnic group (98%) and others that are mostly Igalas (2%) (Anambra State, 2012). Many programmes have been initiated by Federal Government of Nigeria to alleviate poverty in the state including the SOW tailoring training programme of the NDE that is still being implemented. It is expected that after more than 22 years of implementing the programme in rural areas of the state, that poverty would have been reduced. Unfortunately, many people are still living in poverty in the state hence the need to ascertain the efficacy of the programme.

Records from Anambra State office of the NDE show that the programme has trained 328 beneficiaries in basic tailoring between 1991 and 2013. The trained 328 constituted the study population. Snowball sampling technique was used to sample 103 of them. Information supplied by the sample enabled categorize them into; beneficiaries that had only six months of SOW training on basic (i.e. B1 and 23 in number), beneficiaries that are employees in tailoring enterprises (i.e. B2 and 40 in number) and self-employed beneficiaries in tailoring enterprises (i.e. B3 and 40 in number).

A questionnaire / interview schedule with reliability co-efficient of 0.78 using Cronbach Alpha and a focus group discussion guide were used in collection of data. Three groups of focus group discussions that consisted of a group of 7 beneficiaries for each of the three groups of: B1, B2 and B3 were held. The two instruments were validated by three experts from University of Nigeria Nsukka.

One hundred and three copies of the questionnaire / interview guide were administered. The instrument was administered either as questionnaire or as interview schedule depending on each respondent's disposition. Most of the employed beneficiaries were administered the questionnaire in their workshops as interview as they had no time to fill the questionnaire and the method enabled considerable observations to be made. Few beneficiaries that lives outside the state were administered the questionnaire using telephone interview. The use of mostly interview in collecting information provided holistic understanding of their responses that were complemented by focus group discussions. There was 100% return rate on the administered questionnaire / interview schedule. The data were analyzed using mean for research questions 1 and 3 that accepted any item with computed mean score of 2.50 criterions or above and rejected any that scored below. Applying the NBS formula, per capita income earnings of; below or equals ₦ 76, 000., between ₦ 77, 000 and ₦ 151, 000, between ₦ 152, 000 and ₦ 226, 000, and above ₦ 226, 000 were used as bench mark for categorization of: the extreme poor, moderate poor, relative poor and non-poor respectively in answering research question 2. The t-test was used to test one null hypothesis at 0.05 level of significance.

Findings and Discussion

Table 1 shows that, beneficiaries that were trained for six months under SOW (i.e. B1) possessed competencies in performance of five basic tailoring tasks out of twelve. The skills

they possessed include: taking of body measurement, sewing of straight line stitches such as in sewing of household articles that include; pillow cases, bed sheets, head and arm rests among others. They also possessed skills in caring for sewing machines and storage of sewn garments and fabrics. The beneficiaries however lacked seven tailoring competencies that included; drafting of pattern, cutting and sewing of different types of garments among others. What is pertinent is that six months of SOW's training on basic tailoring did not provide the beneficiaries with sufficient skills in sewing of clothes for men, women and children and that the beneficiaries lacked reading and book keeping skills. Focus group discussions revealed that the 22% of the B1 beneficiaries could not go for further training on basic tailoring after six months of SOW training due to their core poverty situation. However, the other two groups of beneficiaries (B2 and B3) that could afford to go for more training on basic tailoring after SOW's training possessed on the whole eight basic tailoring skills out of the twelve assessed skills. The B3 that are in self-employment have more in-depth possession of the skills than the B2. Focus group indicated that two years training would be ideal for acquisition of all basic tailoring skills even though most of the B3 beneficiaries that had about 2 years training and many post-training years' experience on tailoring have not yet mastered four skills of: pattern drafting and cutting, sewing of men's wears, reading and following sewing machine manuals including book keeping. In addition, revelations from focus group discussions suggest that adequate funding, effective monitoring and evaluation of SOW programme including follow-up of its beneficiaries would contribute in making the programme achieve its set key objective of empowering beneficiaries with sufficient tailoring skills for them to be in tailoring employment.

Table 1 Acquired Tailoring Competencies of Beneficiaries of SOW Scheme Based on their Employment Status.

S/N	Item Statements	B1		B2		R	B3			
		\bar{x}	SD	\bar{x}	SD		\bar{x}	SD		
Possess ability to										
1	take measurement of different parts of the body	2.64	0.70	+	3.54	0.72	+	3.69	0.62	+
2	draft, lay and cut patterns	1.29	0.60	++	2.49	0.52	++	2.43	0.84	++
3	do free hand cutting of all types of style	1.57	0.66	++	3.00	1.06	+	3.20	1.14	+
4	Sew stitches	2.50	0.80	+	3.00	1.09	+	3.50	1.26	+
Sew different types of clothes e.g.										
5	menswear	2.27	0.31	++	2.16	0.24	++	2.32	1.04	++
6	womenswear	2.40	0.53	++	3.43	1.21	+	3.62	1.07	+
7	childrenswear	2.43	0.56	++	3.21	0.94	+	3.23	0.94	+
8	household articles	2.54	0.48	+	2.91	0.80	+	3.27	0.61	+
9	press and store sewn garments properly	2.70	0.36	+	3.42	1.14	+	3.68	1.03	+
10	care for sewing machines	2.51	0.56	+	3.08	0.83	+	3.19	0.79	+
11	read and follow sewing machine manual	2.27	0.49	++	2.30	0.94	++	2.30	0.19	++
12	Book keeping	2.26	0.69	++	2.35	0.94	++	2.38	0.57	++

N = 103 (B1 =23, B2 =40, B3 = 40); + means competent and ++ means not competent

The findings agree and contrast with findings of some authors in similar and different settings. For example, Adebeisi, and Ukpore, (2014) assessed competencies of products of tailoring training programme of National Poverty Eradication Programme–Capacity Acquisition Scheme (NAPEP-CAS) in southwestern Nigeria and found that beneficiaries

acquired all the needed tailoring skills that enabled them to sew well-fitting garments to the satisfaction of their customers. The authors explained that the beneficiaries of the NAPEP-CAS are earning high income and that they are sufficiently meeting their needs. In contrast, however, Amubode & Folade, (2012) found that most Nigerian tailors lack skills to sew well-fitting and well-finished garments to the dismay of their customers even as Madi (2007) found lack of skills in book keeping among beneficiaries of an Indian poverty alleviation programme that sets out to improve income earnings of its beneficiaries. Similarly, Okeke (2004) noted that graduate of home economics lack basic tailoring skills which is in tandem with findings of Abiamunwue, Seriki–Mosadolorun, & Lemon (2014). The authors observed that most tertiary level graduates of clothing and textile courses could not draft, cut and sew good garments without assistance. In the same vein, Naijarules (2011) reported that most Nigerian tailors lack creativity needed to make their services professional with the result that many Nigerians patronize better sewn imported ready-to-wear garments even though they are costlier. High consumption of imported ready-to-wear garments could have negative implications for Nigerian tailors in terms of diminished income among others.

The B1 are not in Table 2 because they are not engaged in tailoring occupation and they earn nothing from the trade. The table also shows that annually, 35% of B2 beneficiaries in tailoring occupation as employees earn between ₦ 1,000 to ₦ 77, 000 that place them in the extreme poor category while 65%, of them that earn between ₦ 78,000 to ₦ 151, 000 belong to the category of the moderate poor. All the B3 (i.e. self-employed tailors) earn above extreme and moderate poverty categories as only 10% of their earnings are in relative poverty group while the rest (i.e. 90%) earn above ₦ 227,000 that places them in the non-poor group. According to findings of focus group discussions, the self-employed tailors have many years of practice in the occupation, having first served as employees/journeymen that enabled some of them to save money which they later deployed in starting their tailoring businesses.

Table 2 Annual Distribution of Income Earnings of Beneficiaries of SOW Based on their Employment Status in Tailoring Occupation

S/N	Amount	Tailor Employees (B2)		Self Employed Tailors (B3)	
		F	%	F	%
1	₦ 1,000 - ₦ 77,000 (Extreme Poor)	14	35		
2	₦ 78,000 - ₦ 151,000 (Moderate Poor)	26	65		
3	₦ 152,000 - ₦ 226,000 (Relative Poor)			4	10
4	Above ₦ 226,000 (None- Poor)			36	90

N = 80:- B2 =40, B3 = 40

The finding agrees with the findings of Madi (2007). According to the author, an Indian poverty alleviation project failed totally to improve income earnings of 22% of the beneficiaries while income that accrued to 44% of the beneficiaries did not meet their expectations as most of their needs remained unmet. Similarly, Adaigho, and Izeke, (2009), Offing and Daniel (2010) and Enoma, Ugbomhe and Dirisu (2010) found that income earnings of small business operators in most rural areas were very low that they hardly take care of their children's education, clothing, housing and food provisioning needs meaning that majority of them have not improved their well-being and are still living in absolute poverty. The authors embarking on savings was a far cry for most of them. Conversely, Ukpore, (2014)

noted that products of a tailoring training programme earned enough income that enabled them to be in employment in the trade synchronizing findings of Eze (2009) that a rural development programme brought enhanced income earning that improved socio-economic well-being of beneficiaries in Ebony State in Nigeria.

Table 3 shows that both B2 and B3 spend most of their incomes in meeting their basic physiological and social needs of food, clothing, housing, health care, education, participation in community activities and expanding their businesses. The B3 (self-employed tailors) have marginal income to spend on savings and luxury confirming that what they earn is in the non-poor category while B2 (employee tailors) that are mostly journeymen with limited experience in the occupation earn low income which does not guarantee their well-being beyond meeting their basic physiological and social needs. The study has shown that it was the higher earned income of the self-employed tailors that contributed to their leveraging of wider needs, which would eventually translate to more satisfaction or happiness for them than employee tailors that earn lower income. The findings agree with Madi (2007). According to the author, 22% of beneficiaries of an Indian poverty alleviation project admitted that the programme did not improve their well-being at all, while 44% indicated that the project helped them to generate incomes that were not enough for them to meet their basic needs. This means that high income earning correlates positively with higher level of well-being as many needs would be met. Similarly, Adaigho, and Izeke, (2009), Offing and Daniel (2010) and Enoma, Ugbomhe and Dirisu (2010) found that because income earnings of small business operators in most rural areas were very low, that they hardly take good care of their children's education, clothing, housing and food provisioning needs. The implication is that low income earning means poverty and does not make for well-being in living standard. Also agreeing with the findings, Enoma, Ugbomhe and Dirisu (2010); Adaigho, and Izeke, (2009) revealed that most business operators in rural settings could not expand their businesses because their meager earnings are not enough for them to meet their basic needs meaning and that most of them cannot embark on savings for expansion of their businesses or for the unexpected.

Table 3 Well-Being of Beneficiaries of SOW in Tailoring Employment Based on their Expenditure Pattern

S/N	I spend more money:	Employees in Tailoring Occupation (B2)			Self-Employed in Tailoring Occupation (B3)		
		X2	SD		X3	SD	
1	on basic physiological needs e.g. on food, clothing and housing	3.18	0.10	+	3.10	0.11	+
2	on basic social needs e.g. health care, education, & participation in community activities	3.33	0.12	+	3.65	0.20	+
3	expanding my business	3.03	0.14	+	3.01	0.75	+
4	engages in futurist savings	2.31	1.18	++	2.55	0.91	+
5	buying some luxury goods many cars, take titles etc.	2.40	1.23	++	2.50	0.97	+

+ Means where most of the income are spent; ++ means where most of the income are not spent

Table 4 Summary of t-test Statistics of Employees and Self-employed Beneficiaries of SOW in Tailoring Employment

Categories N	N	\bar{x}	df	t-cal	P-value	Decision
Employees in Tailoring Enterprise	5	2.34	8	0.885	0.415	HO Accepted
Self-employed in Tailoring	5	2.85				

The null hypothesis that there is no significant difference in well-being of beneficiaries of the SOW scheme that are employees and self-employed in tailoring occupation based on their level of expenditure is accepted since the P-value (0.415) is greater than 0.05 level of significance ($P > 0.05$). That means the mean ratings of the employee and self-employed tailors are the same.

Summary of Findings

- Six months of SOW's training on basic tailoring did not provide beneficiaries with sufficient skills for them to be in employment in the occupation.
- Twenty two percent of the beneficiaries could not go for further training on basic tailoring after six months of SOW training due to their core poverty situation, while 78% of the beneficiaries could afford to go for further training.
- Thirty-five percent of the beneficiaries in tailoring occupation as employees earn so low and are still living in the extreme poverty condition, while 65% of them earn what put them in moderate poverty status.
- Self-employed tailors have many years of practice in the occupation and earned more than employee tailors
- All the self-employed tailors' earnings are above extreme and moderate poverty categories with only 10% of them having earnings that place them in relative poverty group, the rest (i.e. 90%) earn above ₦ 227,000 and belong to the non-poor group.
- Both employee tailors and self-employed ones spend most of their incomes in meeting their basic physiological and social needs with no significant difference in their expenditure pattern even though self-employed tailors spent some marginal income on savings and luxury that translates to greater hope, satisfaction and happiness that was the case for employee tailors.

Recommendations

- Two years should be allocated for training on basic tailoring under the SOW programme
- Retraining programme should be organized for tailors to take care of training need gaps
- More emphasis should be paid on topics such as: pattern drafting, cutting, sewing of men's wears, reading and following of sewing machine manuals including book

keeping during training on basic tailoring to ensure adequate mastering of the skills by the trainees.

- SOW programme should be adequately funded, effectively monitored and evaluated with follow-up programme instituted for beneficiaries of the programme.
- Development based vocational skill training programmes for the poor should specially target the extreme poor to ensure that special supports are provided for them to the point of starting their own businesses instead of training them half-way that benefit nobody.

Conclusion

Six months of SOW's training on basic tailoring did not provide beneficiaries with sufficient skills for them to be in employment in the occupation meaning that the hope for increased family happiness that could have informed participation in the programme were dashed for many. Nevertheless, 80% of the beneficiaries that completed the SOW training and went for further training on the trade possessed sufficient skills that enabled them to be tailoring employment. The older graduate beneficiaries are the self-employed tailors and earn higher income than the younger graduates. Most of the young graduates of the tailoring training programmes are still working as employees for their master trainers. The employee tailors lack capital with which to start their own tailoring businesses. Nevertheless, both employee tailors and self-employed ones lack competencies in skills of: pattern drafting, cutting, sewing of men's wears and have no culture of reading and keeping business records. The earned higher income of the self-employed tailors enabled them to meet their basic physiological and social needs including marginally meeting their growth needs unlike the employee tailors. The employee tailors are only at the level of meeting their basic physiological and social needs. Core condition of poverty was identified as the reason that hindered 22% of the SOW beneficiaries that completed the programme from not sponsoring themselves for further training on basic tailoring. Two years training was recommended for basic tailoring training under the programme including provision of adequate funding and other supports that would guarantee graduates of the programme starting their own self-employed businesses as tailors.

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Home Economics Education for the Palestinian Refugees at UNRWA School in the Hashemite Kingdom of Jordan

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Abstract

A survey of the actual state of home economics education at the UNRWA School, in Jordan, has been completed. Up to the 10th year after enrollment, pupils study a variety of areas in the field of home economics, such as public health, national life, home electronics, primary repair of home machines, agriculture, environmental conservation, customer-care, tourism, and so on. Class management was well established, with a teaching guidance plan available for teachers and evaluation sheets for each pupil. Based on a Pareto analysis of the tables of contents of the textbooks in use, we can observe that units on health and hygiene, home electronics/machinery/information, and dietary concerns are the most frequently taught at the preparatory school level. The home economics curriculum, based on data from the above-mentioned survey, is moderately well carried out at the UNRWA School in Jordan as a part of its vocational education division.

Introduction

After the foundation of the State of Israel, many people were displaced and forced to flee their homes. These people became the group we know today as Palestinian refugees. The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) defines this group in their documents as “Persons eligible to be registered in UNRWA’s Registration System and to receive UNRWA services” if their normal place of residence was Palestine during the period 1 June 1946 through 15 May 1948, and if they lost both their home and means of livelihood as a result of the 1948 conflict. Today, the term *Palestine refugees* refers to these people and the descendants of male Palestine refugees, including legally adopted children (UNRWA, 2009).

UNRWA, created in December 1949, is a relief and human development agency; it is the only agency dedicated to helping refugees from a specific region or conflict, and is separate from the UN Refugee Agency (UNHCR). As of July 2014, the number of refugees registered by UNRWA was 5,094,886 (UNRWA, 2015). The number of refugees is increasing at a rate of roughly 3.0% per year. Nowadays, the children of the Palestinian refugees are being educated according to the educational systems of their host countries.

There are five host countries and regions. They are: Lebanon, Syria, the West Bank, the Gaza Strip, and Jordan. Jordan has accepted the largest number of Palestinian refugees, and is now home to more than 2 million of them. Jordan has 173 schools providing basic education to refugees from the first through tenth grades, and serves more than 117,000 pupils studying under the management of the UNRWA (UNRWA, 2015).

Amman New Camp (also known as Wihdat Camp) is one of the ten and is the largest refugee camp in Jordan, with more than 50,000 people domiciled there since 1948. There are 13 schools in the Amman New Camp, all of which are managed by the UNRWA and based on the educational system established by the Jordanian government. The structure of the educational system in Jordan consists of a two-year cycle of pre-school education, ten years of compulsory basic education, and two years of secondary academic or vocational education, after which the students sit for a General Certificate of Secondary Education Exam— the *Tawjihi*. Home economics education in Jordanian primary schools is carried out under the subject name “Vocational Education”. Until 2009, the home economics courses called “Home Economics” were taught in primary schools at the 8th, 9th, and 10th grade levels, but after the educational reform known as “ERfKE” was introduced, the curriculum was merged into the vocational education division. The reform was comprised of four components: education policy and strategy, curriculum and teacher upgrading, infrastructure and physical site upgrading, and early childhood education. Since implementation of the reform, all primary students study topics in each of the following fields:

1. Public health and safety
2. Home matters and public life
3. Engineering skills and light maintenance
4. Agriculture and the environment
5. Economics and technology
6. Hospitality and tourism

This paper focuses on the home economics education offered at the UNRWA School in Amman, Jordan and includes details of a classroom visit and analyses of the contents of the textbooks used in “vocational education,” which corresponds to the home economics curriculum for each grade.

Method

One of the authors visited UNRWA Girls’ Preparatory School Nos. 1 & 2, located at Amman New Camp, in March 2013. There, he observed a vocational education classroom of ninth graders. The unit of study during the visit was a practical project of patching and applique. Thereafter, a brief interview was carried out with teachers in the vocational education department about the actual problems they face daily. Finally, the tables of contents of the textbooks for all grades were analyzed by translating the Arabic text into English. This was followed by a Pareto analysis. Different kinds of documents, such as a daily lesson plan for the class and a student evaluation sheet, were also analyzed after being translated into English.

Results and Discussion

Class Management

The school runs on double shifts in the morning and the afternoon, as shown in Table 1. Each shift has six periods of 40 minutes each. There is a short line up time before classes begin.

Table 1 Time schedule of classes for the 2013 Winter Semester

Winter morning time			Winter evening time		
Chime	7:15		Chime	11:45	
Lineup	7:15	7:25	Lineup	11:45	12:00
1 st period	7:25	8:05	1 st period	12:00	12:40
2 nd period	8:05	8:45	2 nd period	12:40	1:20
3 rd period	8:45	9:25	3 rd period	1:20	2:00
Break	9:25	9:45	Break	2:00	2:20
4 th period	9:45	10:25	4 th period	2:20	3:00
5 th period	10:25	11:05	5 th period	3:00	3:40
6 th period	11:05	11:45	6 th period	3:40	4:20

Among the six topics as mentioned above, “home matters and public life” corresponds well to home economics. The main topics of the home matters and public life classes are shown in Table 2.

As shown in Table 2, students learn a wide variety of topics about home economics beginning in the 1st grade (age 6). One class per week is held from the 1st through 4th grades, and twice a week in 5th grade and above. The average number of students in a class is between 36 and 40.

Table 2 Main topics in the home matters and public life class by grade

Grade	Topics	Grade	Topics
1st	Caring for personal utensils Harmful detergents	2nd	House cleaning Caring for clothing Equipment used in cleaning the house
3rd	Taking care of the classroom Care for personal appearance Reporting obligations common in everyday life	4th	House cleaning Woolen textiles
5th	Care of household appliances Caring for one’s clothes Patched Card	6th	Healthy dwellings & their care Needlework Natural textiles
7th	Home decorating Hand embroidery (cross stitch) Managing of heating expedites	8th	Describing the rights, responsibilities, and expectations of family members Negotiating & problem solving Stain removal
9th	Patchwork Using a sewing machine	10th	Home budgeting Sewing clothes without a pattern Decision making Voluntary work

Figure 1 shows the instruction manual sheet for the patching and applique lesson delivered to the students in Arabic (with an English translation). The procedures for patching and appliqueing are described precisely and in a student-friendly way. Work time was well planned within a successive couple of class periods, allowing time for students to complete their final products.

Table 3 shows the Arabic-language lesson plan for the patching and applique work, followed by an English translation. The sheet includes items such as special outputs, performance indicators, behavior contents, time, instruments and supplies, learning and teaching strategy, and evaluation strategies. All tools needed for the lesson are displayed on the sheet, to help the class run smoothly. As shown in the last column of Figure 2, a numerical evaluation is carried out for every student after the class.

الترياق و الابلق

الهدف: ان تنفذ الطالبة مشروع الترياق بطريقة صحيحة خالية من الازياء

الفئة المستهدفة: الصف التاسع

الادوات الازمة: قطع بلد «اوراق بيضاء، اقلام، الوان، مقصات، دبابيس تثبيت، خيوط و ابر منسبة

مبدئي الصغرة تفكري خطوات عملية الترياق و الابلق الرئيسية ونظفها خطوة خطوة كما اكلت احداها انتقلت الى الاخرى.

بد تحديد المشروع المراد انجازه قومي بما يلي

اولا: رسم النموذج على الورق بخطوط مرئية وواضحة مستعينة بالادوات الازمة و بالحجم المطلوب .

ثانيا: قص تفاصيل النموذج كل واحد على حدا .

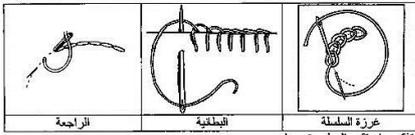
ثالثا: مراعاة تناسق الالوان عند اختيار قماش اللباد .

رابعا: تثبيت الالوان المقصوصة على القماش بالدبابيس و يفضل اعادة رسمها قبل القص بقلم الرصاص .

خامسا : قص القماش مع مراعاة الاقتصاد في القماش ما امكن .

سادسا: تثبيت قطع القماش معا و تزيناها بغير خيوط ملانمة .

بعض الغرز المستخدمة



ذكري ان تقييم العمل يعتمد على :

دقة الرسم على الورق ، ترتيب قص الالوان، تناسق الالوان، تثبيت الالوان على القماش بشكل صحيح، نقل الرسم بقلم رصاص الى القماش، قص القماش بشكل مرتب ، قص القماش بشكل اقتصادي ، تثبيت القطع بشكل مرتب، تزوين القطع بغير خيوط ملانمة، مراعاة امور السلامة العامة، تعاون المجموعة، نظافة المكان ، الالتزام بالوقت المحدد، شكل المنتج النهائي.

Patching and Applique

Objective: implementing a patching project correctly and free of mistakes.

Targeted grade: 9th grade

Necessary tools: felt pieces, white paper, pens, colors, scissors, sewing pins, thread, and needles

Dear little artist, remember the main patching process, and carry it out step by step.

After selecting a project to be implemented, do the following:

First: Draw your proposed model on your paper accurately and in real size using the appropriate tools.

Second: Cut out the shapes tidily and every piece alone.

Third: Take into account the color consistency when choosing felt.

Fourth: Attach the shapes to the cloth correctly by using sewing pins, and draw the shapes on the cloth with a pencil.

Fifth: Cut out the cloth as economically much as possible.

Sixth: Attach the pieces together, and decorate it with appropriate stitches.

Accuracy of drawing on paper, cutting the shapes tidily, color consistency, attaching shapes to the cloth correctly, drawing shapes on the cloth with a pencil, cutting out the cloth tidily, cutting out the cloth economically, attaching the pieces together tidily, decorating the pieces with appropriate stitches, taking into account public safety, group cooperation, cleanliness of the workspace after the completion of the project, commitment to time, and the shape of the final product are all to be evaluated.

Figure 1 Instruction manual sheet for the patching and applique delivered to the students, Arabic original and English translation

Table 3 Teaching plan for the patching and applique, Arabic original (English translation follows)

المحور و الوحدة		الاقتصاد المنزلي/ الترياق و الابلق	
موضوع الدرس		مشروع عملي للترياق او الابلق	
المعيار		لنتاج مشروع ترياق او ابلق قابل للعرض	
الصف و الشعبة	اليوم و التاريخ	الخصص	التاسع ا
التاسع ب	٣/٢٤	٣٥	التاسع ب

النتائج الخاصة مؤشرات الأداء	المسلوك المدخلي	المحتوي		الزمن	الادوات و اللوازم	استراتيجية التعليم و التعلم	استراتيجيات التقويم و ادواته
		النظري	العملي				
ان ترسم الطالبة نموذج التصميم بالحجم المطلوب ويخطوط مرتبة و واضحة على الورق	استخدام المقصات	رسم النموذج	رسم النموذج	٥٥ دق ١٥ رسم النموذج	ورقة عمل ورق ابيض . الوان .	بعد التمهيد للدرس وقياس التعلم القبلي عبر الاسئلة " ما هي خطوات عملية الترياق الاساسية" وتحديد الاهداف الخاصة يتم توزيع اوراق العمل على المجموعات و اختيار مشاريع ملانمة باشراف المعلمة و البدء برسم التصميم تته المعلمة الي ضرورة مراعاة امور السلامة العامة اثناء العمل و قص التصميم بطريقة دقيقة	المتابعة و تقديم تغذية راجعة و فورية للطالبات بالاضافة الى سلم تقدير عددي
ان تقص الطالبة كل شكل من التصميم على حدا	استخدام المقص وتمريره	قص التصميم	قص التصميم	١٠ د	مقص	تعرض المعلمة نماذج متقاسمة و تؤكد على ضرورة تعاون المجموعة في هذه الخطوة يتم توزيع اللباد على الطالبات	
ان تراعي الطالبة تناسق الالوان عند اختيار قماش اللباد	تناسق الالوان	اختيار قماش متناسق الالوان	اختيار قماش متناسق الالوان	١٠ د	نماذج من اعمال الطالبات . قماش لباد	تعرض المعلمة نماذج متقاسمة و تؤكد على ضرورة تعاون المجموعة في هذه الخطوة يتم توزيع اللباد على الطالبات	
ان تثبت الطالبة البترونات على القماش بطريقة صحيحة مع ضرورة اعادة الرسم بالرصاص	استخدام دبابيس الخياطة	تثبيت البترون على القماش	تثبيت البترون على القماش و اعادة الرسم	٢٠ د	دبابيس الخياطة	عرض طريقة التثبيت امام الطالبات ومتابعة الطالبات اثناء العمل مع التاكيد على امور السلامة العامة	

Subject / Title	Home economics / patching and applique
Lesson subject	Practical project for patching or applique
Standard	Producing showable project of patching or applique

Table 3 Teaching plan for the patching and applique, Arabic original (English translation)

Grade and Class	Day and Date	Periods
9 th A		
9 th B	24/3	2 nd & 3 rd

Special outputs performance indicators	(Behavior portal) Means of patching	Contents		Time	Instruments and supplies	Learning and teaching strategy	Evaluation strategies and its tools
		Theoretical	Practical				
Drawing a model of required size and design with clear and tidy lines	Use ruler		Drawing the model	5 minutes learning and 15 minutes drawing the model	Worksheet, white paper, colors	After doing a theoretical explanation using questions, such as “What are the basic steps of patching?” and identifying specific objectives, distribute worksheets to groups, choose appropriate projects under the supervision of the schoolmistress, and start drawing the model.	Follow-up and provide immediate feedback and a numerical evaluation scale for students
Cutting out shapes tidily and every piece alone	Use scissors		Cutting out the shapes	10 minutes	Scissors	Schoolmistress gives care to public safety and cutting out the design correctly.	
Taking into account the color consistency when choosing felt cloth	Color consistency		Choosing harmoniously colored cloth	10 minutes	Models of the work of students, felt, cloth	Schoolmistress shows harmonious types and emphasizes the need for the group to cooperate in this step. Distributing felt to the students	
Attaching shapes on the cloth correctly and redrawing shapes on the cloth with a pencil	Use sewing pins		Attaching shapes and redrawing	20 minutes	Sewing pins	Schoolmistress shows the students how to attach fabrics, follows-up with students at work, and emphasizes public safety.	
Cutting out the cloth as economically as possible	Use scissors		Cutting the cloth	5 minutes	Scissors	Schoolmistress gives care to the importance of using the cloth economically and the benefits of the patching	
Attaching the pieces and decorating it with stitches	Stitch relapsing Underlay and chain		Attaching the pieces	15 minutes	Thread and needles	Schoolmistress comments on ways of attaching cloth, allows the advanced groups to start the attaching process, and to complete the attaching as homework.	
Appreciation of the importance and beauty of handiwork		Importance of handiwork				What do you think about the piece in your hand? What do you expect it to be like when it’s completed? Do you want to repeat the experience?	

Figure 2 shows the three-scale evaluation sheet for each student, in Arabic and an English translation. There are 14 evaluation items taken from the standpoint of artificial aspects (e.g., evaluation item Nos. 1 and 5), and from the technical aspect (e.g., item Nos. 2, 6, and 7).



سلم تقدير عددي لمشروع الترقيع
اسماء طالبات المجموعة:

الرقم	معايير الاداء	٣	٢	١
١	رسم الشكل المقترح على الورقة بدقة وبالحجم الحقيقي			
٢	قص الاوراق بشكل مرتب وكل قطعة على لوحدها			
٣	مراعاة تناسق الالوان عند اختيار اللباد			
٤	تثبيت الاوراق على القماش بشكل صحيح			
٥	نقل الرسم الى القماش بقلم رصاص			
٦	قص القماش بشكل مرتب			
٧	قص القماش بشكل اقتصادي			
٨	تثبيت القطع معا بشكل مرتب			
٩	تزيين القطع بغرز ملائمة			
١٠	مراعاة امور السلامة العامة			
١١	تعاون المجموعة			
١٢	نظافة المكان بعد الانتهاء من العمل			
١٣	الالتزام بالوقت المحدد			
١٤	شكل المنتج النهائي			

Numerical evaluation scale for patching project

Group student names:

No	Performance Standard	1	2	3
1	Drawing proposed model on paper accurately and in real size			
2	Cutting out shapes tidily and every piece alone			
3	Taking into account the color consistency when choosing Felt			
4	Attaching shapes to the cloth correctly			
5	Drawing shapes on the cloth by pencil			
6	Cutting out the cloth tidily			
7	Cutting out the cloth economically			
8	Attaching the pieces together tidily			
9	Decorating the pieces with appropriate stitches			
10	Taking into account public safety			
11	Group cooperation			
12	Cleanliness of the place after the completion of the work			
13	Commitment on time			
14	The shape of the final product			

Figure 2 Evaluation sheet for each student with three scale in Arabic language, and English translation

Interview with vocational education school teachers

Around 60 teachers are working for UNRWA schools as vocational education teachers. The academic qualifications of the teachers are as listed in Table 4. Teachers who majored in nutrition dominate, including those with both Master and Bachelor degrees. Teachers who majored home economics and vocational education are approximately 10% of the total. Every teacher leads between 22 and 26 classes per week in the vocational education department.

Table 4 Academic qualification of the vocational teachers

Number of Teachers	Academic Qualification
3	MSc. in Nutrition
1	MSc. in Environment
1	MSc. in Anthropology
44	B.Sc. in Nutrition
4	B.Sc. in Arts & Crafts
2	B.Sc. in Public Health
1	B.Sc. in Vocational Education
6	B.Sc. in Home Economics

The specific topics or efforts that UNRWA schools provide for the Palestinian students, in addition to the host country's curriculum, are as follows:

1. Enrichment materials through projects that enhance the Palestinian identity and heritage, such as folk embroidery and preparing traditional foods from herbal plants.
2. Professional growth for vocational education teachers in home economics subjects through the holding of training workshops on patchwork and hand embroidery (cross stitch), food processing, mushroom production, and stain removal.
3. Assist teachers directly through team/model, co-teaching, and classroom observation on using proper teaching strategies for home economics topics.
4. Support teachers in assessing and analyzing students' achievements by identifying different strategies for all learners, in order to improve the quality of teaching and learning (authentic assessment).
5. Preparing orders to provide materials, resources, and tools that support the teaching and learning of home economics topics in schools, such as: Panama material, cotton gingham, denim, needles, fabrics, and embroidery yarns.

Analyses of the vocational education textbooks' tables of contents

Students use two textbooks per school year during every grade in the vocational education program. Thus, the tables of contents of the 20 textbooks were analyzed. Figure 3 shows the table of contents for the second semester of the 3rd grade. Tables of contents consist of units and lessons. The units were categorized into 13 groups. Six groups (dietary environment, health and hygiene, habitat, clothing environment, community and society, and family) were chosen from the study by Sasai et al. (2009), and six other groups (traffic, tourism, account and business administration, home electronics/machinery/information, energy and environment, and horticulture/cultivation/agriculture) were also chosen from the unit analyses. For example, the unit contents for the health and hygiene are listed in Table 5 in the grade order.

Figure 4 shows the Pareto chart of the units in the tables of contents. The units covering health and hygiene, home electronics/machinery/ information, and dietary environment are most frequently taught in the preparatory schools. High rates of diabetes among Palestinian refugees (i.e., 11.4% of those over the age of 40, for a total of around 114,000 patients) seem to be one of the reasons why the health and hygiene and dietary environment units are so frequently taught (UNRWA, 2014). The prevalence of risk factors among the region's diabetes patients is unacceptable, with 90% obese and overweight, and 20% smokers (34.1% of males and 11.3% of females). Therefore, the effort to raise health awareness from the preparatory schools on to families and society is an urgent issue for the Palestinian refugees and the region as a whole.

Arabic		English Translation	
قائمة المحتويات		Topic	P
		Unit 1: Medicinal Plants	5
		First lesson: Medicinal Plants	8
		Unit 2: Materials and Electrical Hand Tools and Their Use	15
		First lesson: Simple Electric Material and Hand Tools	17
		Second lesson: Practical Applications of Simple Electric Material and Hand Tools	20
		Unit 3: Noise and Its Risks	29
		First lesson: Noisiness	31
		Second lesson: Health and Safety Rules in Dealing with Computers and Electronic Devices	38
		Unit 4: Care of the School's Facilities and its Cleanliness	45
		First lesson: Classroom Environment	48
		Second lesson: Cleaning Tools	54
		Unit 5: Communication Through Reporting Symbols	61
		First lesson: Shapes and Symbols in Our Life	64
		Second lesson: The Language of Shapes and Symbol	73
		Unit 6: Hospitality and Tourism	79
		First lesson: Concepts and the Basics of Tourism and Hospitality	81
		Second lesson: Concepts and Fundamentals Related to Tourist Sites	90
		Unit 7: Cooperation	97
		First lesson: Cooperating in a Community	99
		Second lesson: The School Cafeteria	104

Figure 3

Table of contents of the second semester for the 3rd grade, in Arabic with English translation

Table 5 Unit contents for the health and hygiene

Grade	Semester	Unit Contents
1	1	Personal Hygiene, Health and Disease
1	2	Oral Health
2	1	Health of the Five Senses
3	1	Personal Hygiene
3	2	Medicinal Plants
4	2	Common Health Problems
5	1	Medicinal Plants
5	2	First Aid and Dealing With Drugs
6	1	Adolescence
6	2	First Aid, Medicines
7	1	Health and Infectious Diseases, Epistaxis: Causes and Ways to Prevent it

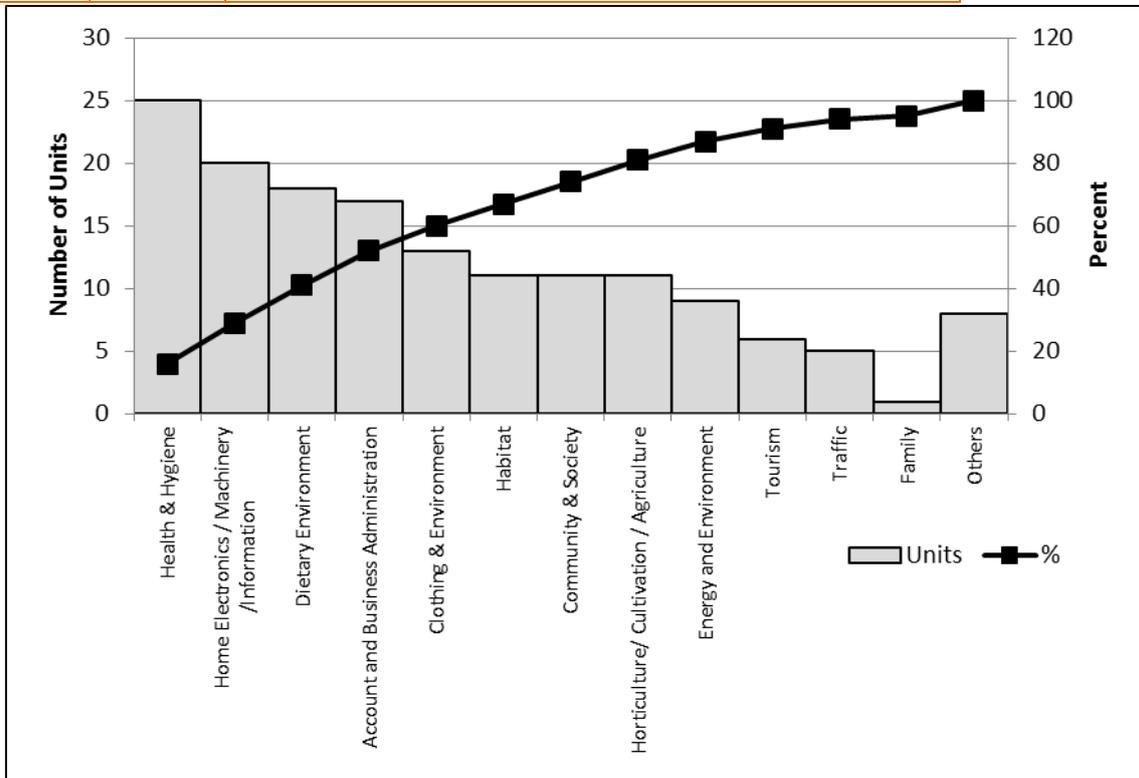


Figure 4 Pareto Chart of the Units of Tables of Contents

Conclusion

The situation of home economics education in the UNRWA School at Amman, Jordan was surveyed by visiting a class and analyzing the class documents and the textbooks’ tables of contents. Home economics education is carried under the auspices of “vocational education.” Classes are managed smoothly with the use of well-designed documents for both teachers and students. Units for health and hygiene are the most frequently taught in the vocational education classrooms.

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Towards a culture of disaster resilience: families and Home Economics

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Abstract

Disaster risk is a concern for the Home Economics discipline because this directly affects the daily life of individuals and families. Disaster events have short and long term impact on the quality of life of individuals and families and for those who experienced severe losses their vision of hope and happiness are often shaken. This paper explores the role of Home Economics in achieving the United Nation's goal of creating disaster resilient households and communities. The first part reviews literature on Disaster Risk Reduction and Management (DRRM) particularly disaster-related studies at the household level. It highlights key concepts in DRRM relevant to family studies, such as risk, vulnerability, resilience, and coping and adaptive capacities. The second part presents the contribution of Home Economics to the disaster field of study and public policy. Home Economics offers a unique frame for DRRM with its emphasis on family as the unit of study, the integrative approach, and the common goals and basic needs concerns of DRRM and Home Economics. The critical science paradigm of Home Economics gives a comprehensive understanding of family vulnerability, resilience and wellbeing—pre and post-disaster. DRRM literature shows the need for disaster-related home economics researches for more evidence-based information that determines how and why families and communities are affected by disasters and how they can be empowered to respond to, recover and resist the adverse effects of disasters.

Disaster: A worldwide concern

Between 1994 and 2013, there was a recorded 6,873 natural disasters worldwide, which claimed 1.35 million lives or almost 68,000 lives on average each year. In addition, 218 million people were affected by natural disasters on average per annum this 20-year period. (CRED, 2015, p.7)

Around the world, disasters from natural hazards occurred more frequently in the last 20 years. This is accompanied with an upward trend in death rates. Although the number of people affected by various kinds of disaster-causing natural hazards shows a downward trend, these disasters have had a disproportionately negative effect on low income countries. Countries face varying degrees of risk from natural disasters every year (CRED, 2015). There may not be a totally safe country in the world, but there are places which are more exposed to and are adversely affected by various types of natural hazards.

Disaster risk should be of great concern for the Home Economics discipline because this directly affects individuals and families. Effects vary from minor disruption of daily lives to loss of livelihood, homes and lives (Garschagen et al. 2014). Disaster events have short and long term impact on the quality of life of individuals and families. Home economics can help

in enabling families and households to maintain a level of wellbeing in the face of disaster. To understand

the place of Home Economics in the field of disaster studies and policies, the concept of Disaster Risk Reduction and Management (DRRM) is explored in Part 1 of the paper. Part 2 discusses the contribution of Home Economics to the disaster field of study.

Part 1. Disaster Risk Reduction and Management

The occurrence of natural disasters and its effect on human welfare and development remain one of the mega-concerns of countries around the world since the 1990's. As such, 1990-2000 was declared the International Decade for Natural Disaster Reduction. A World Conference in 1994, created the Yokohama Strategy for a Safer World which identified general guidelines for natural disaster prevention, preparedness and mitigation, and a call for a global culture of prevention. Ten years later, UN member countries met again and came up with new directions outlined in the Hyogo Framework for Action (HFA) (UNISDR, n.d.).

The early years of disaster studies and policies focused on hazards, civil defense issues, and emergency management (Manyena, Mavhura, Muzenda & Mabaso, 2013; McEntire, 2005). Disaster was approached from a natural science perspective with researches on engineering and infrastructure, prediction, early warning systems, hazard mapping, and impact studies (McEntire, 2005; Roberts, Nadim & Kalsnes, 2009). Then with the United Nation's recognition that this is a critical issue that impacts development, the focus shifted to the human component because from the standpoint of sustainable development, efforts in dealing with environmental issues such as disasters whether natural or man-made should revolve around the promotion of welfare of individuals, families, communities and societies (Yokohama Strategy 1994; Hyogo Framework for Action 2005). The United Nations Institute for Disaster Reduction (UNISDR) placed emphasis on comprehensive actions that involve all stakeholders and advocated for disaster risk reduction and management (DRRM) which aims to substantially reduce disaster losses in lives and resources of communities and countries.

The disaster risk reduction and management cycle (Figure 1.) describes the series of actions undertaken in the entire period of dealing with a disaster by the different stakeholders at all levels. Broadly, it is divided into three periods: pre-disaster period (before the hazard event), emergency period (during the occurrence of the hazard) and post-disaster period (after the hazard has passed) (Khan, Valescu & Khan, 2008). In terms of specific actions and outcomes, it can be broken into the following phases: prevention and mitigation, preparedness, response, and recovery. Disaster risk reduction (DRR) covers the prevention, mitigation and preparedness activities that are accomplished before and in anticipation of a hazard event. These activities are done to resist, avoid, minimize, or lessen the adverse effects of disaster. Disaster risk management (DRM) involves the emergency response and recovery activities done during and post-disaster. DRM actions take place when the actual hazard event strikes and throughout the period of getting back into normal functioning. This ability to return to normal functioning using internal resources is termed as *resilience*.

DRRM is seen as a comprehensive approach with *risk* as a pivotal concept that integrates the natural and social components of disasters and *resilience* as a desired outcome.

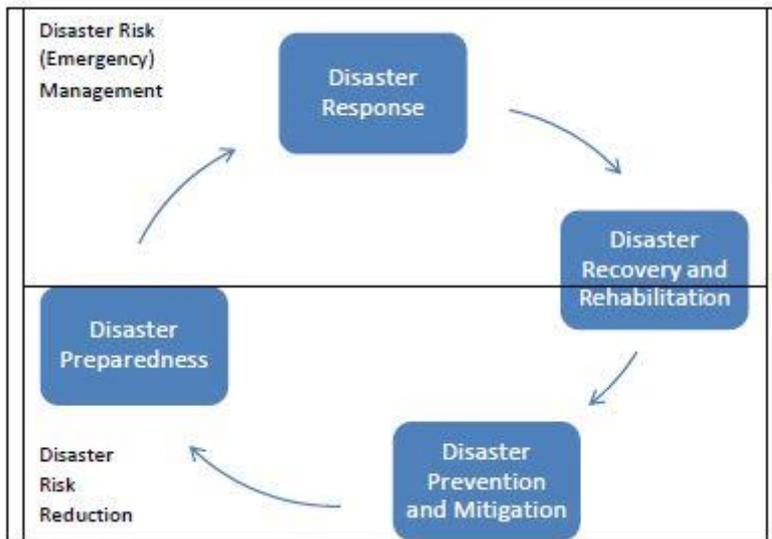


Figure 1 Disaster Risk Reduction and Management Cycle

Risk

The concept of risk has two major factors, exposure to hazard and its potential negative consequences, particularly on the human system (Klinke & Renn, 2002; UNISDR, 2005, Brooks, Adger & Kelly, 2005). Natural or man-made phenomena are considered risk factors when there is a probability that it will cause undesirable consequences or negative impacts (Brooks et al. 2005). Hazards become disasters when these result in serious disruptions of the human environment such that functioning is impaired without external assistance (UNISDR, 2005). Shaluf (2007) clarified the typology of disasters identifying natural, man-made, and hybrid disasters. There is however, a trend to veer away from the term *natural disaster* as this may overlook the human input to the disaster risk equation (Bankoff, 2007; Fara, 2001). Further, it should be stressed that the type of hazard, its magnitude and duration, and variation all contribute to the potential harm and adverse effects that could be experienced by the human environment (Henly-Shepard, 2013; Shaluf, 2007; Brooks et al. 2005). The World Risk Index (Garschagen et al. 2014), computes risk as the product of exposure to natural hazards and vulnerability of the population.

Vulnerability

Vulnerability is a key factor for the determination of disaster risk (Fara, 2001; Klinke & Renn, 2002; Brooks et al. 2005; Roberts et al. 2009). UNISDR (2005) defines vulnerability as “the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of hazard” (p.9). Disaster risk reduction stress that it is not the occurrence of natural hazards that leads to disruption and losses but the vulnerability of households to negative impacts of their exposure to hazards (Fara, 2001; Weichselgartner, 2001). The concept of vulnerability has been widely discussed in research literature. Weichselgartner (2001) and McEntire (2005) reviewed the various definitions and perspectives of vulnerability but there is still no common definition across the social sciences (Roberts et

al. 2009). Vulnerability encompasses a wide range of characteristics and circumstances and is applied to different levels of analysis from micro to macro levels.

The dimensions of vulnerability have also been the subject of different studies. *Spatial or geographic vulnerability* results from households being located in a place highly exposed to natural hazards and climate change effects (Fara 2001; Manuel-Navarette et al. 2007; Fekete, 2012). *Physical vulnerability* refers to condition of physical structures and living spaces (e.g. houses, buildings, infrastructures) that limits ability to provide protection from and withstand the effects of hazard exposure (Blaikie, Cannon, Davis, & Wisner, 1994). *Economic vulnerability* focuses on the effect to livelihood and economic assets (Saldaña-Zorilla, 2008; Sakai, Estudillo, Fuwa, Higuchi & Sawada, 2012). *Social vulnerability* deals with disproportionate impact of events and circumstances on socially disadvantaged groups such as women and children, minorities, those with health risks, and the poor (Wisner & Luce, 1993; Blaikie et al., 1994; Van Willegen, Edwards, Edwards & Hesse, 2002; McEntire, 2005; Donner & Rodriguez, 2008; Adams, 2008; Walters & Gaillard, 2014; Fekete, 2012; Sakai et al. 2012; Doberstein & Stager, 2013).

As there are numerous definitions of vulnerability, measures of vulnerability also vary. Brooks et al. (2005) identified 11 key indicators of vulnerability to arrive at a composite vulnerability index. A macro-level formula for estimating vulnerability based on hazard value probability and disaster occurrence from historic data was proposed by Joseph (2013). A multicriteria statistical modeling of flood vulnerability from multiple dimensions of risk and coping capacity was developed by Scheuer et al. (2011). Roberts et al. (2009) used a model for vulnerability analysis that combined natural and social science approaches by quantifying vulnerability with consideration for vulnerability factors, exposure and other contextual factors. Another model that integrates the natural and social aspects is the syndrome analysis used by Manuel-Navarette et al. (2007) that looked into clusters of patterns from socio-ecological (human and environment) interactions called syndromes which may be repeated in larger systems.

Coping and Adaptive Capacity

Coping or adaptive capacity can be viewed in relation to resilience where the presence and activation of capacities contribute to resilience; or in relation to vulnerability where lack of capacities lead to higher levels of vulnerability. The conceptualization of coping and adaptive capacity is wide-ranging with some literature using the two terms in the same context of adaptation (Few, 2003), interchangeably (Wamsler & Dawson, 2012) or distinct from each other (Henly-Shepard et al., 2014).

Henly-Shepard et al. (2014) described adaptive capacity as a “long-term ability to recover from and adapt to disaster or a long term transformation” in contrast to the “short-term” period for coping capacity (p. 3). In Klein, Nicholls & Thomalla (2003) analysis of UNISDR’s concept of resilience, adaptive capacity appears to point to the social system’s ability to self-organize and increase its capacity for learning and adaptation from their disaster experience. Adaptive capacity varies according to local and environmental contexts of the social system and changes over time (Smit & Wandel, 2006).

In the conceptualization of Norris, Stevens, Pfefferbaum, Wyche & Pfefferbaum (2008), adaptive capacity is a product of resources available to the social system and the dynamic attributes of these resources. They identified four sets of resources: economic development, social capital, information and communication, and community competence. Sherrieb, Norris & Galea (2010) developed an index to economic development and social capital and found that these adaptive capacities correlated positively and could be used to predict community resilience.

Some studies focus on specific aspects of coping. Bonye & Godfred (2011) studied the social coping mechanisms in Ghana and found that traditional community institutions and community social support help communities cope with different kinds of disasters. Eriksen, Brown & Kelly (2005) discovered that economic coping strategies of smallholder farmers in Kenya and Tanzania to drought involved variations in the kinds and number of alternative labor or livelihood activities, some of which result in adaptation, marginal returns or even increased vulnerability. In a similar study in Uganda, seven economic coping strategies were determined to vary according the kind of hazard experienced (Berman, Quinn & Paavola, 2014). The study of Brahmi and Poupouh in Lao PDR (2002) also revealed that local coping mechanisms are place and hazard specific and may even result in long term vulnerability.

Resilience

For most of the decade of the HFA, there was a strong global campaign for developing a culture of disaster preparedness and risk reduction but the movement for a culture of disaster resilience is now getting much support especially in disaster policy and research (Cavallo & Ireland, 2014; Henly-Shepard et al. 2014). Resilience is a concept used in many disciplines, such as engineering, agriculture, psychology and mental health, ecology and family studies, among others (Norris et. al. 2008). Like risk and vulnerability, there exists a diverse conceptualization of resilience. In disaster literature in which resilience is an emerging concept, it takes on different meanings depending on the scale of analysis. Common elements in the concept of disaster resilience included the presence of a disruptive event, coping or adaptive capacity, and a return to some level of functioning, i.e., 'to bounce back' after the event (Boon, Cottrell, King, Stevenson & Millar, 2012). These elements come together in the experiences of households or the community as either an outcome, a process or both (Abramson et al. 2014).

Klein et al. (2003) sees resilience as the amount of risk that the household can absorb and still be able to self-organize (adaptive capacity) for preparing, planning and implementing technical measures before, during and after a disaster. A process oriented view of resilience defines it as a process of activation of resilience attributes (resources) that enables the household to adapt and recover from disaster and leads to enhanced disaster preparedness (Abramson et al. 2014). Henly-Shepard et al., (2014) measured place-based social resilience as a combination of coping (short term for response and management) and adaptive (long-term for recovery and adaptation) capacities, risk and preparedness perceptions, and community participation of households. Cavallo and Ireland (2014) recognized the complexity of disaster events and suggested two kinds of resilience to be developed: specified and general resilience that covers both the foreseen and unforeseen risks that are interdependent and often present in natural hazards. Specified resilience cover known risks where social

systems employ action plans previously developed from a historical analysis of disasters. General resilience reflects the ability of the system to face unforeseen shocks or stresses and involves a bottom-up approach to building resilience (Cavallo & Ireland, 2014). Both specific and general resilience are usually employed simultaneously and there may be trade-offs when there are competing demands.

Community resilience, as Norris et al. (2008) defines it is a “process linking a network of adaptive capacities” for adaptation, which ultimately means a level of wellness, after disturbance (p. 127). Paton and Johnson (2001) added an interpretive dimension to resilience by looking at it as a “function of the operation” of personal characteristics and the ability to provide a sense of coherence and meaning to the experience. Similarly, in case studies of communities, Pagaduan (2010) reports that when households were asked about their meaning of resilience, they described actions or attitudes that are optimistic, empathetic and hospitable.

The literature on DRRM shows that despite more than 20 years of advocacy and studies on disaster, there is still a lot of ground to cover in terms of creating a common understanding of even the basic concepts of risk, vulnerability, resilience and adaptive/coping capacities. This gap is even wider in the area of household-level analysis. Since most policies are community-based, it is reasonable that these concepts would take community-level focus. Recently, there is shift towards household-level focus especially with more intensive advocacy in building household resilience and strengthening individual capacities while reducing vulnerability. However, as the studies are commonly conducted by experts who are more involved with community or national level policies and programs, there is a need for practitioners in fields that work directly with families. This presents a timely opportunity for Home Economics to fill the gap in disaster studies.

Part 2. Home Economics and Disaster Resilient Families

DRRM and Home Economics share the same goal - the promotion of well-being of individuals and families in changing environments. The International Federation for Home Economics (IFHE) states that home economists work for the empowerment and wellbeing of individuals, families and communities with the “ultimate goal of the improvement of the quality of their everyday life including the management of their resource” (IFHE, n.d.). Basic human needs, individual well-being, family strengths and community vitality were identified as the core concepts of the discipline (AAFCS, 2010). This is similarly reflected in the definition of home economics as “the study of families and the resources available to them for the satisfaction of basic needs in changing environments” (Florencio, 1995, p.1).

Disasters change the environment of families and thus can have varying effects on the well-being and daily lives of families. Disaster is one risk factor that have short and long term impact on the quality of life of individuals and families (Pendergast, 2012) and for those who experienced severe losses their vision of hope and happiness are often shaken. Moreover, it is often unexpected, immediate, have unanticipated consequences, and affects many families at one time. With the effects of climate change on the environment, there is greater concern worldwide for disasters and the welfare of affected families. This may also be part of a convergent moment (Pendergast, 2012) that could provide an opportunity to future-proof the

discipline. Much attention is now placed on the participation of households and communities in processes that would reduce disaster losses and build a culture of preparedness and resilience (Man yena et. al. 2013; Pande, 2006).

Contribution of HE to Improving Disaster Risk Reduction and Management of and for Families through HE research

Individual and family well-being is the central focus of home economics. In the DRRM field, studies, programs and assessments have been done at different social system levels from the individual, household, community, national up to the regional levels. Risk and vulnerability assessments were usually conducted at the community and national level than at the level of the individual and household (Notenbaert, Karanja, Herrero, Felisberto & Moyo, 2013). Studies on social vulnerability looked more into collective data and spatial characteristics (Doberstein & Stager, 2013; Sakai et al. 2012; Fekete, 2012; Fara, 2001; Walters & Gaillard, 2014; Donner & Rodriguez, 2008) than individual or household data. Much of the vulnerability models were developed with community or national scale application. Yet the role of families or households in both disaster risk reduction and risk management is widely acknowledged (CRED, 2015; UNISDR, 2005) and these broad-based models may not be effectively applicable at the level of households (Notenbaert et al. 2013; Wisner & Luce, 1993). Micro-level research is recognized as essential for better and more evidence-based information that explores and determines how and why households and communities are affected by disasters (CRED, 2015). There is also a need to study the outcomes of disaster risk interventions on human lives and livelihoods.

Home economics provide an integrated and holistic approach to the study of families especially of the different aspects of its well-being (McGregor and Goldsmith, 1998). Currently, the quest continues for a comprehensive approach that integrates both the natural and social sciences in disaster studies (Roberts et al. 2009). Home economics is an applied field that draws from both those domains as well as the arts and humanities (Florencio, 1995). Its strength is in the integration of the material aspects with the dynamics of relationships in family life (ibid). Vulnerability and household behavior, such as in the area of disaster preparedness and response, can be explained by a complex set of factors and resources both within the life course of individuals and families and across the human ecosystem (AAFCS, 2010).

McEntire (2005) argues that policies on disaster risk management would improve with a better understanding of the concept of vulnerability, especially at the household level. Disaster vulnerability issues of the human system identified in disaster research as affecting DRRM are areas of study in home economics and its related fields. The issues, such as poverty (Sakai et al. 2012; Sun, Chen, Ren & Chang, 2010; Fara, 2001), housing and shelter (Doberstein & Stager, 2013; Walter & Gaillard, 2014, Otake et al. 2012), women and children's welfare (Peek, 2008; Bateman & Edwards, 2002); social justice (Henly-Shepard, 2013), food security and nutrition (Wright & Vesala-Huseman, 2006; Otake, et al. 2012), clothing (Otake, et al.), and livelihood (Berman et al. 2014) are components of the basic needs focus of home economics. Numerous studies in home economics had been done in addressing these areas but not in relation to disaster risk. Otake et al. (2012) emphasized the need for further studies on the changing conception and perception of basic needs throughout the disaster cycle. The

campaign for individual and household disaster preparedness would be more effective with a definitive understanding of how to determine family vulnerability to different kinds and severity of natural hazards. It is also important to effectively communicate and teach families how to determine their vulnerabilities in order for them to engage in disaster preparedness, prevention and mitigation efforts.

These basic needs studies at the individual and family level across the disaster management phases could also help improve DRRM programs and policies at the community, institutional and national levels. Studies on emergency relief foods that are nutritionally adequate and culturally acceptable while meeting food safety requirements would be very useful for disaster relief agencies. In a study on psychological resilience of disaster survivors, Barnes

(2006) proposed the concept of a “home away from home” shelters. This concept needs to be developed more fully to address not only the psychological needs but the other dimensions of basic needs of families. There is also a need to better understand the process of how families recover and get back into normal functioning. The concept of what constitutes “normal functioning” after disaster in the context of the complexity of family functions is largely an unexplored area. Yet this information could provide concerned agencies valuable inputs in planning and implementing recovery and rehabilitation programs.

With regards to effective disaster response and recovery practices at the household level, family resource management approach to the study of family coping strategies and adaptive capacities would show how families make decisions and utilize resources used to cope or adapt. A shift in focus from “coping” to “managing” may even be needed to emphasize the degree of control of families over their resources, thus empowering them. While the human system is no longer considered passive, there still seems to be an assumption that mere presence of capacities will result in positive action.

Coping mechanism connotes emergent actions in order to deal with unexpected or new events. For recurring disaster events, families develop a set of strategies to manage the effects of such event (Henly-Shepard et al. 2014). How and when these strategies are employed is still being studied. Most researches measure the presence of capacities and correlate these with measures of vulnerability or resilience, and only a few considered how these capacities are actually utilized. In Abramson et al.’s (2014) resiliency model, individuals and communities activate resources that help them recover from disasters. For Norris et al. (2008), adaptive capacities are composed of resources with specific attributes that individuals and households utilize in the process of resilience. The family resource management approach highlights the decision making process at the household level. This raises the point that household actions and behaviors are decided upon by family members in the context of relationships. It also puts emphasis on resources—how resources are appreciated, assessed and allocated for specific actions or strategies. In this approach, how families make decisions of when, where, who and how adaptive or resilience resources will be employed during a disaster event could be examined.

A Culture of Disaster Resilience

Building a culture of disaster resilience is a complex and lengthy process. It requires establishing consciousness for risks and vulnerabilities, effective modes of action and new mindsets. Resilience has been explored in family life studies before it was used in the context of household disaster research. Resilience is a vital aspect of empowered families who are able to take control of their resources and situations to substantially reduce the potential risks from disasters, and to recover quickly and maintain wellbeing in the occurrence of natural hazards. Even so, disaster resilience is a relatively nebulous concept. There are many questions that still remain to be answered to make a coherent and singular message. To shed a new light to the concept of household resilience, a research focus on the family instead of the household is needed. It was argued by Bruce and Lloyd (1992) that household studies rarely go beyond the physical and temporal boundaries while family studies incorporate meaningful relationships.

The critical science paradigm in home economics could provide a comprehensive framework for clarifying this concept. The critical science paradigm was Brown and Paolucci's adaptation of Habermas' critical theory (Smith, 1998; Yoo, 1999). It encompasses three dimensions of human interest: the technical, communicative and emancipatory interests, which are considered interwoven dimensions of family life and family well-being. (Baldwin, 1996; Pendergast, 1998). Table 1 lists some possible research questions on household disaster resilience from the critical science paradigm of home economics.

Technical interest refers to the material aspect of family life, such as the basic human needs of food, clothing, and shelter (Baldwin, 1996). It involves technical knowledge in manipulating and controlling the natural world as a means to achieving goals (Vincenti, Smith & Fabian, 2004). Research in this area are usually done using empirical science and positivist approaches. Technical interests in disaster resilience focus on effective utilization of family resources in their coping and adaptive strategies. It also includes empirical studies on quality relief efforts that adequately addresses the families' basic needs. As Otake et al. (2012) in their experience of the 2011 disaster in Japan acknowledged, the challenge is pursuing a sustainable life when there is very minimal resources for even the most basic of human needs.

The communicative interest is also known as the practical-moral dimension that highlights shared understanding meanings, values, norms (Baldwin, 1996). It focuses on seeking mutual agreement following the precepts of communicative rationality. Interpretive, hermeneutics, historical and humanities research designs are some social science approaches that can be employed for studies in the communicative interest. Developing disaster resilience among families involves an understanding of their shared meanings of disaster, risk perception and basic family functioning from which the family's concerted actions or coping strategies are based on. Interpretive studies on family communications and support systems during disaster in the light of family relationships could provide an understanding of how disaster resilience is established in the family.

Emancipatory interest is concerned with improving human condition and promoting truth and justice through freedom from systematic repression, conflicting ideologies and distorted communications (Smith, 1997). The emancipative action towards human autonomy involves

self-reflection and reflective critique of structures, processes and actions of systems surrounding the family which are studied using the critical science approach. Research in this interest could focus on how families value the external support and what factors constrain them from using their own resources effectively in dealing with disasters.

Table 1 Some questions on household DRRM and resilience from the three human interests

Technical	Practical	Emancipatory
<p>What is the most effective way of achieving resilience given the limited resources of the family?</p> <p>What family resources could be allocated for disaster preparedness, response and recovery?</p> <p>How could these resources be employed successfully across the disaster phases?</p> <p>What are the standards of relief to disaster affected families that addresses their needs and enables them to maintain a level of well-being, in terms of</p> <ul style="list-style-type: none"> • Food and nutrition • Shelter • Clothing and personal needs • Relational needs • Livelihood <p>What is the effective way of enabling the family to still fulfill their functions during and post-disaster?</p>	<p>What does it mean for families to be vulnerable, at risk and resilient?</p> <p>Do all members of the family share in the importance of disaster risk management?</p> <p>How can the family members be involved in disaster preparedness?</p> <p>What is the level of preparedness necessary to lessen vulnerability?</p> <p>What are the social support resources and capacities available to the families pre, during and post-disaster?</p> <p>What forms of reciprocity are evident in the way social support are constructed?</p> <p>What indigenous or local warning systems are employed by families, the community?</p> <p>How can warning systems be communicated effectively to individuals and families?</p> <p>How can a systematic, quick response system be developed among families and communities?</p> <p>What modes of learning would be effective to building a culture of resilience?</p> <p>How are decisions made in the family with regards to disaster risk management concerns?</p>	<p>Why do families feel or think the way they do about disaster risk management and resilience?</p> <p>Is the family's concept of vulnerability, risk, resiliency, preparedness and others the same as the larger systems?</p> <p>Is there a disconnect between the actual conditions of vulnerability, risk and resilience and what is being reported?</p> <p>What is its impact on the status of the family and the way their needs are addressed?</p> <p>What mindset is needed to build a culture of resilience?</p> <p>What are the enabling and constraining factors that influence the process of building a culture of resilience?</p> <p>Are there specific groups of families or sectors most affected by disasters? Why?</p> <p>Are there structures that make some group more vulnerable than others?</p>

The disaster literature shows a clear need for involvement of specialists who delve into individual and household level studies and who are knowledgeable of the dynamics within families. Clearly, this is the purview of home economics. One of the hallmarks of being disaster resilient is the family's ability to pursue hope and happiness amidst the disruptions and losses they experience. Home economics can have a valuable contribution to the field of DRRM and to creating disaster resilient families as they share the same goal of addressing basic needs and maintaining the well-being of individuals and families especially during times of changing environments.

Biography

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Does parental financial assistance assist young adults to be financially healthy? Effects of parent-child relationship qualities on financial outcomes and happiness

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Abstract

Many parents provide financial support for young adult children (Padilla-Walker, 2012). This financial support could help or hinder young adults' financial well-being. This current study investigates young adults' financial outcomes (e.g., financial responsibility, money management behavior and worry about money) as mediators of the associations between qualities of parent-child relationships (e.g., closeness with father, closeness with mother, spending time with father, and spending time with mother) and young adults' overall happiness. The role of parental financial support was tested as a moderator of all significant pathways.

Data from the Transition into Adulthood data set of the 2011 Panel Study of Income Dynamics (PSID 2011), a nationally representative US sample were analyzed for this study. The respondents included in the analysis ranged from 17 to 27 years of age (N = 1,907). Structural Equation Modeling (SEM) was used with M-plus software to test the model comparing young adults who received parental financial assistance to those who did not.

The results indicate that financial behaviors mediated the associations between the quality of young adults' relationships with their parents and overall happiness. In particular, less worry about money and close relationships with their fathers significantly affected young adults' overall happiness regardless of receiving financial support from their parents. In addition, the SEM model is significantly different depending on whether or not young adults receive financial support from their parents. Young adults' money management behaviors affected overall happiness only when they did not receive financial support from their parents. Young adults who had close relationships with their mothers showed less worry about money only when they did not receive parental financial assistance. Results from this study provide insight that the parents' financial assistance may not help young adults strive for financial well-being arising from their own financial behaviors.

Introduction

Financial issues are an important influence on young adults' subjective well being and happiness (Serido, Shim, Mishra, & Tang, 2010). In addition, most American young adults are not financially independent from their parents (Danziger & Ratner 2010). Although financial independence is an important developmental task for young adults, financial behaviors and financial stress from their financial activities are equally or more important because financial

habits that are formed during early adulthood tend to persist throughout the lifespan (Serido et al., 2010). Financial habits may affect young adults' mental health by causing financial stress, financial dissatisfaction, and psychological distress (Serido et al., 2010; Shim, Barber, Card, Xiao, & Serido, 2010; Xiao, Tang, & Shim, 2008). Therefore, it is important to understand the factors that affect young adults' financial attitudes and behaviors.

Previous studies have investigated the influences of parental financial socialization on young adults including parents' SES, parental financial behaviors, parental direct teaching, parental modelling, and parental financial communication (Serido et al., 2011; Shim et al., 2010). In this study, we focused on qualities of relationships with parents as perceived by young adults as an important family process that affects young adults' financial attitudes and behaviors. Developmental studies have found that qualities of parent-child relationships crucially influence young adults' competence and success in accomplishing major developmental tasks (Fitzpatrick & Vangelisti, 1995). However, the influence of parent-child relationship qualities on the domain of financial well-being of young adults has received little research attention.

The purpose of the current study was to examine the effects of parent-child relationship qualities on young adults' money management behavior, financial responsibility and worry about money, and overall happiness. We accomplished this goal by testing a path analysis model using the Transition to Adult 2011, Panel Study of Income Dynamics (PSID, 2011). Additionally, we investigated the role of parental financial support as a moderator of associations among qualities of parent-young adult relationships, financial outcomes, and overall happiness. Literature on the qualities of parent-child relationships and financial socialization is reviewed in the following sections to provide a foundation for this study.

Parent-young Adult Relationships and Young Adult Development

According to the theory of emerging adulthood (Arnett, 2004), emerging adults (individuals age 18 to 25) of the 21st century have distinct characteristics including: 1) identity exploration, 2) instability, 3) focus on the self, 4) feeling in-between, and 5) countless possibilities. Although the child-parent relationship that was formed in early childhood is important (e.g., parent-child attachment), parenting does not stop when children become adults (Bowlby, 1969) and parent-child relationships are important throughout the lifespan. Family dynamics and children's interactions with parents are powerful influences on young adults' development especially during the time of the transition to adulthood (Bartle-Haring, Brucker, & Hock, 2002).

Qualities of parent-child relationships such as parental warmth, acceptance, and support are related to positive development of young adults. According to Darling and Steinberg (1993), parenting styles function as a context that moderates parenting practices and children's willingness to be socialized; therefore, parental warmth can enhance young adults' receptiveness to parental practices and socialization values. Warm relationships between parents and children motivate children to comply and cooperate with parents (Grusec & Goodnow, 2004; Laible, Thompson, & Froimson, 2007). Parental acceptance and support are positively associated with self-esteem of young adults (Buri, 1987) and high levels of interpersonal skills (Dalton, Frick-Horbury, & Kitzmann, 2006). Specific to financial socialization, parental warmth has been investigated as a predictor for children's financial

activities (Kim, LaTaillade & Kim, 2011). Parental warmth was positively associated with children's saving for future schooling (Kim et al., 2011). In addition, the good parent-child relationship regarding financial topics (e.g., "since coming to college, I argue a lot with my parents about money matters (reversed)") is positively associated with budgeting and saving behaviors (Serido et al. 2010). Although parenting styles can be considered as characteristics of parents (Darling & Steinberg, 1993), parenting styles have also been described as relational constructs that reflect the relationship between dyads (Laible et al., 2007).

Financial Socialization Outcomes and Indicators

Financial knowledge is a primary factor that may positively affect responsible financial management behavior (Perry & Morris, 2005). Grable, Park and Joo (2009) reported that young adults' financial knowledge and income on young adults' financial management behavior and they found that financial knowledge was positively associated with responsible financial management behavior. Family of origin income is another important predictor of young adults' responsible financial behaviors. Hilgert, Hogarth and Beverly (2003) reported a strong positive association between resource availability and responsible financial behavior of young adults. Similarly, Perry and Morris (2005) reported that people with incomes over \$35,000 exhibited better financial management behavior than those who had less income. However, Grable et al. (2009) reported that household income did not have a significant effect on responsible financial management.

Effects of Parental Financial Support

Research has examined the effects of parental financial socialization on young adults' developmental outcomes. Padilla-Walker, Nelson, and Carroll (2012) investigated types of parental financial assistance as predictors of young adults' identity, risky behaviors and working hours. Padilla-Walker et al. (2012) measured five areas in which parents could provide financial assistance (tuition, books, housing, daily expenses, and recreation), and divided the parents into four groups depending on the patterns financial assistance provision. The first group consisted of parents who provided a relatively high level of financial support only on tuition, books, and housing, referred to as 'joint providers.' The second group consisted of parents who reported relatively low levels of financial assistance on all variables, and they were named 'minimal-providers.' The third group consisted of parents who reported relatively high support on daily expenses and recreation, including personal expenses not related to education, referred to as 'supplemental-providers.' Lastly, the group of parents who provided high levels of financial support on all five areas was named as 'sole-providers.' Even though there is evidence that the young adults who received financial support from parents during young adulthood more successfully establish themselves economically comparing who do not receive any financial support from their parents (Schoeni & Ross, 2005), Padilla-Walker et al. (2012) found that young adults whose parents were 'sole-providers' reported lower identity as an adult and higher levels of risky behaviors such as drinking and drug behaviors than children of 'minimal-providers.'

Worry about Money

Financial stress is an important source of distress in young adults' lives as most activities of daily living and many opportunities for their success are tightly related to the level of personal financial resources (Pearlin & Radabaugh, 1976). Therefore, financial stress may affect the level of overall life happiness as well. Young adults may experience economic distress, which in turn may cause other problems such as physical and mental illness (Vinokur, Price, & Caplan, 1996) or depression (Broman, Hamilton, & Hoffman, 1990). Financial strain is caused by the level of stress experienced by young adults including perceived financial inadequacy, financial concerns and worries, and adjustments to financial changes (Voydanoff, 1990). According to the theory of financial socialization, financial stress is also affected by parents' behaviors and qualities of relationships with parents. Some behaviors are modelled by parents and influence both attitudes and behaviors of their young adult children. For example, Hibbert, Beutler, and Martin (2004) found that young adults whose parents modelled financial prudence were more likely to avoid debt and less likely to misuse credit cards. While financial attitudes are known to affect financial behaviors, financial distress is a psychological process that is negatively associated with financial well-being, and both financial attitudes and distress are affected by a series of financial behaviors (Serido et al., 2010).

Financial Socialization and Overall Happiness

According to the student financial well-being model (Shim, Xiao, Barber, & Lyons, 2009), financial attitudes, behaviors and financial worries affect life success including overall life satisfaction, academic success, physical health, and psychological adjustment. Positive financial behaviors are associated with financial satisfaction (Xiao, Sorhaindo, & Garman, 2006), and in turn financial satisfaction is associated with overall life satisfaction (Headey, Veenhoven, & Wearing, 1991).

Parental Financial Socialization: A Theoretical Framework for this Study

The conceptual model that guides this study is a financial socialization theory. The concept of financial socialization refers to learning "values, attitudes, standards, norms, knowledge, and behaviors that contribute to the financial viability and well-being" (Danes, 1994, p.128). The theory of financial socialization includes the processes through which children and adolescents develop consumer skills and learn about the adult economic world directly or indirectly from diverse socialization agents (Riley et al., 1969). There has been an enormous amount of research on how children acquire knowledge about economic concepts such as values or money, and how children develop their own consumer attitudes and behaviors. Parents are the most important agents of financial socialization through daily routine observation, communication, and direct instruction (Jorgensen & Salva, 2010). Young adulthood is a critical period for building life-long financial attitudes and financial behaviors, and young adults develop values, attitudes, standards, norms, knowledge, and behaviors regarding financial practices through interactions with parents (Dane, 1994).

Gudmunson and Danes (2011) proposed a conceptual model that captures important factors for financial socialization and the associations among those factors. The conceptual model

links family characteristics and interactions with young adult children's financial attitudes, knowledge, capabilities, and behaviors, which in turn links to financial subjective well-being (Fig. 1). Serido et al. (2010) found a positive relationship between financial behaviors and overall subjective well-being, which informed the framework for our current study (Fig. 2). Children are socialized within families on how to spend, how to manage money, and how to take responsibility for their spending. This financial socialization process can occur explicitly through direct teaching, or indirectly through observation (Gudmunson & Danes, 2011).

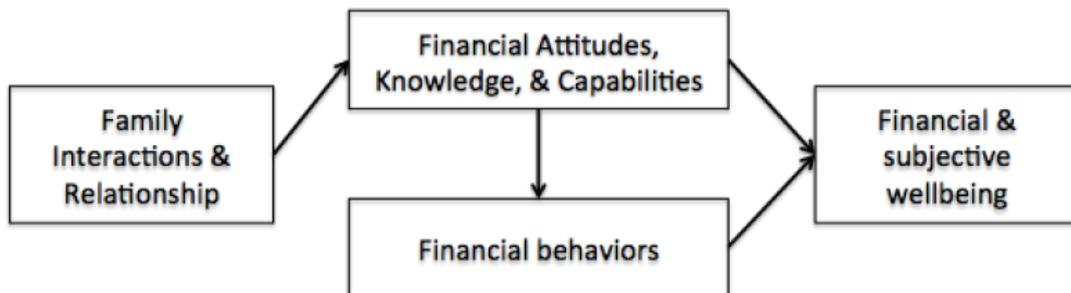


Figure 1 Conceptual model of family financial socialization theory, and financial parenting and wellbeing (Gudmunson & Danes, 2011)

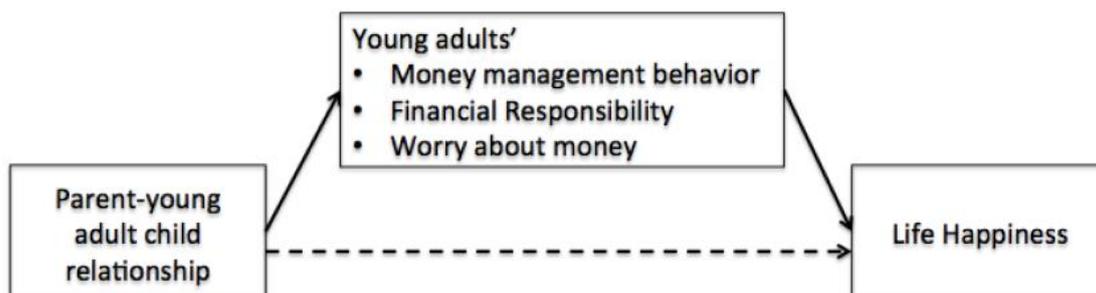


Figure 2 Conceptual model of parent-child relationships, financial emotional and behavioral outcomes, and happiness of young adults

In this study, young adults' financial assistance from their parents will be tested as a moderator of the association between the parent-child relationship and young adults' financial outcomes (e.g., worry about money, financial responsibility, and financial money management behavior). Parental socialization about financial issues has a positive effect on young adults children's financial coping behaviors such as budgeting and saving (Serido et al., 2010). Financial responsibility is an emotional duty felt by young adults about their own living, rent, and money management. In addition, because parents still largely influence many young adults' financial matters, this study will examine the effect of parents' financial support on associations between financial domains (e.g., financial attitudes, financial behaviors and financial worries) and overall life happiness.

Hypotheses

Based on the family financial socialization theory, we will examine the associations between quality of parent-child relationships and financial outcomes. We hypothesize that closeness with father and mother will predict responsible financial attitudes and behaviors. Financial

attitudes, financial behaviors, and financial well-being measured by financial responsibility, money management, and worry about money respectively, will be tested as mediators of associations between quality of parent-child relationships and overall life happiness. The conceptual model guiding this study is presented in Figure 3 and specific hypotheses are as follows:

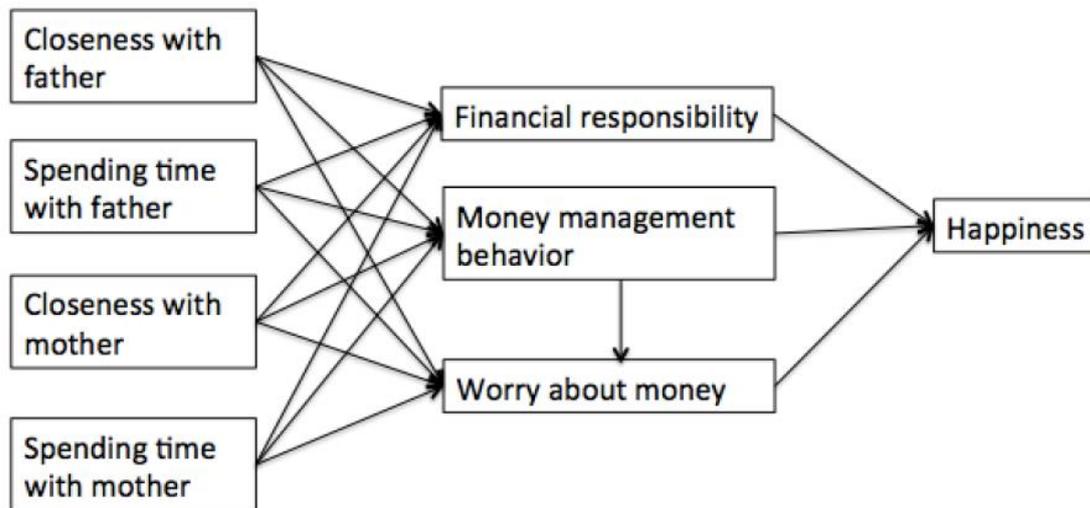


Figure 3 Conceptual model of this study.

- H1a Closeness with father is positively associated with financial responsibility.
- H1b Spending time with father is positively associated with financial responsibility. H1c Closeness with mother is positively associated with financial responsibility.
- H1d Spending time with mother is positively associated with financial responsibility.
- H2a Closeness with father is positively associated with money management behavior.
- H2b Spending time with father is positively associated with money management behavior. H2c Closeness with mother is positively associated with money management behavior.
- H2d Spending time with mother is positively associated with money management behavior.
- H3a Closeness with father is negatively associated with worry about money.
- H3b Spending time with father is negatively associated with worry about money. H3c Closeness with mother is negatively associated with worry about money.
- H3d Spending time with mother is negatively associated with worry about money. H3e Money management behavior is negatively associated with worry about money.

- H4a Financial responsibility is positively associated with happiness.
- H4b Money management behavior is positively associated with happiness. H4c Worry about money is negatively associated with happiness.
- H5 The association from H1 to H4 will be vary depending on whether young adults receive financial support from their parents.

Method

Data

This study used the Panel Study of Income Dynamics (PSID, 2011), and the Transition to Adult (TA, 2011) to examine the role of parents on young adult's financial behaviors. The PSID is a longitudinal study of a nationally representative sample in the US. Annual data have been collected from participants about their demographics, economic and financial behaviors.

Sample

Participants were 1,907 young adults aged 17-27 (mean: 22 year-old). The sample contained approximately equal percentage of women (51.6%) and men (48.4%). The ethnic composition of the student sample included: White (49.9%), African American (43.3%), Asian (1.6%), American Indian or Alaska Native (1.0%) and other race (3.7%). A majority of the participants (86.7%) were 'never married'; 10.5% were 'married'; the remaining participants were separated (1.6%) or divorced (1.0%). Descriptive statistics for the sample are presented in Table 1.

Measures

Qualities of relationships between parents and young adults.

Closeness with father and Closeness with mother were single-item measures that asked the young adults about their feelings on how close they feel to their father and mother, including biological parent/stepparent/adoptive parent/other parental figure. The response categories ranged from 1 (not close at all) to 7 (very close) ($M = 5.27$, $SD = 1.77$ for closeness with father; $M = 6.08$, $SD = 1.36$ for closeness with mother).

Spending time with father and Spending time with mother were measured by single items that asked "During the last 12 months, about how often did you do things with your father (biological father/ stepfather/ adoptive father/ other father figure)/ mother (biological mother/stepmother/adoptive mother/ other mother figure)?" The response categories ranged from 1 (Never) to 7 (Everyday) ($M = 3.20$, $SD = 1.42$ for spending time with father; $M = 3.89$, $SD = 1.44$ for spending time with mother).

Young adults' financial outcomes.

Money management behavior was assessed by one self-report item: "how good are you at managing money?" Young adults responded on a scale ranging from 1 (not at all well) to 7 (extremely well) ($M = 5.53$, $SD = 1.26$).

Worry about money was measured by one item: “how often do you worry about money?” The response categories are ranged from 1 (Never) to 7 (Daily) ($M = 3.77$, $SD = 1.89$). Financial Responsibility was constructed from the average of all non-missing responses to the following questions: 1) how much responsibility for earning own living; 2) how much responsibility for paying own rent; 3) how much responsibility for paying own bills; and 4) how much responsibility for managing own money. Response categories ranged from 1 (Somebody else does this for me all of the time) to 5 (I am completely responsible for this all of the time) ($M = 4.09$, $SD = 1.07$).

Subjective well-being.

Happiness was measured with a one-item question: “This question is about how you have been feeling in the last month. In the last month, how often did you feel happy?” The response categories ranged from 1 (Never) to 6 (Every day) ($M = 4.99$, $SD = .98$).

Parental financial support.

Parental financial support was coded as “1” if the respondents answered ‘yes’ for any of following questions, and “0” if the respondents answered ‘no’ for all of following questions: 1) during last year, did your parents or other relatives purchase a house or condominium for you?; 2) during last year, did your parents or other relatives pay rent or a mortgage on your behalf?; 3) during last year, did your parents or other relatives give you a personal vehicle, such as a car?; 4) during last year, did your

parents or other relatives pay for tuition?; 5) during last year, did your parents or other relatives cover expenses or bills?; 6) during last year, did your parents or other relatives give you a personal loan?; 7) during last year, did your parents or other relatives give you any other financial help?; and 8) during the last two years, have you received any large gifts of money or property or inheritances of money or property?

Analysis

SPSS 22.0 was used for preliminary analysis (descriptives, correlations). Mplus 7.11 (Muthe´n & Muthe´n, 2007) was used to test the conceptual model and to test the hypothesized associations via structural equation modelling (Anderson & Gerbing, 1988).

Results

Table 1 presents the means, standard deviations, and correlations among the study variables.

Overall happiness is positively associated with most variables such as money management and qualities of parental relationship variables, and negatively associated with worry about money. Worry about money is negatively associated with all variables except for financial responsibility. Closeness with father and spending time with father are positively correlated and closeness with mother and spending time with mother are also positively correlated.

Table 1 Correlation coefficients and descriptive statistics of main study variables ($n = 1907$)

	1	2	3	4	5	6	7	8
1. Overall happiness								
2. Financial responsibility	-.03							
3. Money management	.12**	.11**						
4. Worry about money	-.19**	-.04	-.25*					
5. Closeness with father	.10**	-.03	.02	-.09**				
6. Spending time with father	.12**	-.14**	.03	-.09**	.71**			
7. Closeness with mother	.12**	-.04	.10**	-.10**	.17**	.08*		
8. Spending time with mother	.12**	-.17**	.11**	-.07*	.07*	.30**	.55**	
Mean	4.99	4.09	5.53	3.77	5.27	3.20	6.08	3.89
Standard deviation	.98	1.07	1.26	1.89	1.77	1.42	1.36	1.44

* $p < .01$, ** $p < .001$

Table 2 presents the means and standard deviations of the main variables in the study for two groups: those who receive financial support from their parents and those who do not receive financial support from their parents. Young adults who did not receive financial support

were significantly older, on average (1.57 years), than those who did receive financial support from their parents. It appears that young adults who did not receive financial support were of an age when they likely had graduated from college. The young adults who did receive financial support from their parents reported more time spent with both mother and father. Those who received financial support also reported less financial responsibility, better money management behaviors, and more worry about money than the young adults who did not receive financial support from their parents.

Table 2 Means and standard deviation for financial support group and no financial support group

Construct N=1907	Financial Support		No financial Support		t-test	
	Mean	SD	Mean	SD	t	p-value
Age (years)	21.24	2.66	22.81	2.64	-12.87	.000
Closeness with father	5.35	1.70	5.18	1.87	1.86	.062
Closeness with mother	6.12	1.27	6.03	1.45	1.49	.137
Spend time with father	3.32	1.40	3.05	1.45	3.96	.000
Spend time with mother	3.95	1.42	3.81	1.47	2.13	.033
Financial responsibility	3.80	1.11	4.43	.90	-13.71	.000
Worry about money	3.85	1.87	3.68	1.91	1.93	.054
Money management behaviors	5.43	1.22	5.65	1.28	-3.90	.000
Happiness	4.98	.96	5.00	1.01	-.25	.807
Gender	Female	51.6%	Male	48.4%		

Hypotheses were tested with the conceptual model, and based on modification indices, model was revised by adding a direct path from closeness with father and spending time with father to overall happiness, which showed strong positive associations. The model fit of the original and final models are presented in Table 3.

Table 3 Model fit for Measurement

Models	Chi-square	df	RMSEA	CFI	SRMR
Conceptual model	64.163	12	.072	.845	.033
Final model	24.228	8	.049	.952	.017

Note. Ideal threshold for model indices are RMSEA < 0.060, CFI > 0.950, and SRMR < 0.080 (Hu & Bentler, 1999).

Results of the final model are presented in Table 4 and significant paths are depicted in Figure 4.

Hypotheses 1a and 1b, that closeness with father and spending time with father would be positively associated with financial responsibility was not supported for the financial support group or the no financial support group. Hypothesis 1c was partly supported, with a positive association between closeness with mother and financial responsibility only for those who received financial support from parents. Hypothesis 1d, that spending time with mother and financial responsibility was not supported for either group, rather spending time with mother was inversely associated with financial responsibility for both groups.

Hypothesis 2a was supported, with a positive association between closeness with father and money management behaviors for both the financial support group and no financial support group. However, the association between spending time with father and money management was not significant (Hypothesis 2b). There were no significant associations between closeness with mother and financial responsibility (Hypothesis 2c), but there was a positive association between spending time with mother and money management only for the no financial support group (Hypothesis 2d).

Closeness with father was not associated with worry about money (Hypothesis 3a), but closeness with father was inversely associated with money management for the financial support group only, partially supporting Hypothesis 3b. Similarly, closeness with mother was inversely associated with worry about money for the financial support group only (Hypothesis 3c). The hypothesized negative association between spending time with mother and worry about money was not supported; however, spending time with mother was positively associated with worry about money for the no support group at a marginal level of significance ($p = .06$), partially supporting Hypothesis 3d. Money management behaviors and worry about money were inversely correlated for both groups (Hypothesis 3e).

Contrary to Hypothesis 4a, financial responsibility and overall happiness were only significantly associated for the no support group, and in the association was inverse, rather than positive. Money management and overall happiness were positively associated only for the no support group (Hypothesis 4b). Worry about money was inversely associated with overall happiness for both groups (Hypothesis 4c).

Hypothesis 5 was partly supported. Some associations that were hypothesized from H1a to H4c were significantly different between groups. For hypothesis 1d, spending time with mother was negatively associated with financial responsibility for both groups, but the negative association was stronger for the financial support group. In other words, young adults who receive financial support from parents reported less financial responsibility than

those who do not receive financial support from parents. Closeness with mother was negatively associated with worry about money for the financial support group only (Hypothesis 3c). Spending time with mother was positively associated with worry about money for the no financial support group only (Hypothesis 3d). Money management behavior was negatively associated with worry about money for both groups, but the association was stronger for the no financial support group (Hypothesis 3e). Worry about money was negatively associated with overall happiness for both groups but the association was stronger for the no financial support group (Hypothesis 4c).

Additional path 1. Positive association between closeness with father and overall happiness was supported for both financial support group and no financial support group.

Additional path 2. Positive association between spending time with father and financial responsibility was supported for the financial support group only.

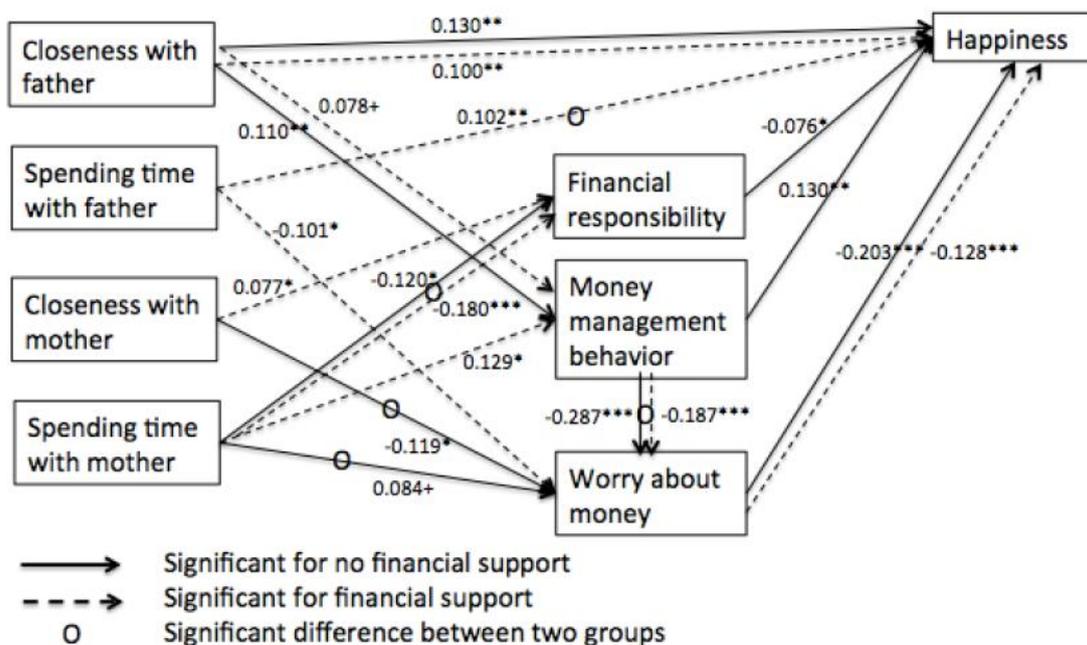


Figure 4 Results of the final model with the significant paths.

Notes

Model fit statistics: chi square = 24.228, df = 12, p-value = .002, CFI = 0.952, RMSEA = .049, SRMR = .017
 + p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 4 Hypotheses and results summary

	Financial support			No financial support			Group Difference	
	Beta	(p-value)	R*	Beta	(p-value)	R*	p-value	R*
H1a Closeness with father is positively associated with financial responsibility.	0.035	(p = .404)	1	0.03	(p = .534)	1	0.768	1
H1b Spending time with father is positively associated with financial responsibility.	-0.053	(p = .241)	1	0.02	(p = .691)	1	0.239	1
H1c Closeness with mother is positively associated with financial responsibility.	0.077	(p = .041)	4	0.008	(p = .857)	1	0.118	1
H1d Spending time with mother is positively associated with financial responsibility.	-0.18	(p = .000)	2	-0.12	(p = .011)	2	0.07	3
H2a Closeness with father is positively associated with money management behaviors.	0.078	(p = .065)	3	0.11	(p = .019)	4	0.668	1
H2b Spending time with father is positively associated with money management behaviors.	-0.041	(p = .373)	1	0.011	(p = .823)	1	0.438	1
H2c Closeness with mother is positively associated with money management behaviors.	0.039	(p = .300)	1	0.07	(p = .116)	1	0.712	1
H2d Spending time with mother is positively associated with money management behaviors.	0.129	(p = .002)	4	0.052	(p = .267)	1	0.221	1
H3a Closeness with father is negatively associated with worry about money.	-0.022	(p = .591)	1	-0.072	(p = .111)	1	0.461	1
H3b Spending time with father is negatively associated with worry about money.	-0.101	(p = .025)	4	-0.038	(p = .418)	1	0.3	1
H3c Closeness with mother is negatively associated with worry about money.	-0.007	(p = .846)	1	-0.119	(p = .005)	4	0.081	3
H3d Spending time with mother is negatively associated with worry about money.	-0.023	(p = .580)	1	0.084	(p = .062)	2	0.084	3
H3e Money management behaviors are negatively associated with worry about money.	-0.187	(p = .000)	4	-0.287	(p = .000)	4	0.06	3
H4a Financial responsibility is positively associated with overall happiness.	-0.025	(p = .444)	1	-0.076	(p = .030)	2	0.156	1
H4b Money management behaviors are positively associated with overall happiness.	0.039	(p = .231)	1	0.092	(p = .013)	4	0.28	1
H4c Worry about money is negatively associated with overall happiness.	-0.128	(p = .000)	4	-0.203	(p = .000)	4	0.096	4
Added path 1 Closeness with father is positively associated with overall happiness.	0.1	(p = .008)	4	0.13	(p = .002)	4	0.651	1
Added path 2 Spending time with father is positively associated with financial responsibility.	0.102	(p = .007)	4	-0.03	(p = .478)	1	0.02	4

Notes

R* = results

- 1 Not supported
- 2 Not supported but significant in opposite direction
- 3 Marginally supported
- 4 Supported

Discussion

There has been growing awareness about parents' roles in shaping young adults' healthy financial attitudes and behaviors. Previously, financial socialization researchers have focused on the effect of parental financial socialization on young adults' financial activities such as financial knowledge, attitudes, and behaviors (Serido et al., 2011; Shim et al., 2010). Some studies have focused on the role of general family process such as parental warmth on financial practices (Kim et al., 2011). In this study, we investigated the effect of qualities of relationship with father and mother separately on the financial behaviors (e.g., financial responsibility, and money management behaviors), financial well-being (e.g., worry about money) and overall happiness of young adults. We also examined how the associations between variables differ according to whether they receive financial support from their parents.

Results indicate that qualities of relationship with father played an important role in enhancing overall happiness of young adults both directly and indirectly through money management behaviour as a mediator. The positive association between closeness with father and young adults' money management is consistent with the finding of Kim et al. (2011) that parental warmth is associated with saving behaviors of adolescents. However, it is different in that closeness with father, but not with mother was significantly associated with financial behaviors. In addition, qualities of relationship with mother were associated with financial responsibility and worry about money. However, close relationship with mother was positively associated with higher financial responsibility (financial support group) and negatively associated with worry about money (no financial support group), while spending time with mother was negatively associated with financial responsibility (both groups) and positively associated with worry about money (no financial support group). This inverse association between closeness with mother and worry about money is consistent with previous research (Serido et al., 2010). However, worry about money had a negative association with having a close relationship with mother but not with father, which differs from the results reported by Serido et al. (2010).

In addition, we found that financial responsibility and money management behaviour are associated with overall happiness only for the group who did not receive financial support from their parents. In other words, young adults who do not receive financial support from parents feel overall happiness when they have less financial responsibility and when they have better money management behaviors, while financial responsibility and money management behaviors were not associated with overall happiness for the young adults who receive financial support from their parents. According to Padilla-Walker et al. (2012), undergraduate students who did not receive financial assistance from their parents were more likely to identify themselves as adults than those who received multiple financial types of assistance from their parents.

Although this study had an advantage of using representative national data, there are some limitations that need to be considered. First, this sample included college students and non-students, and the financial situations of the participants who attend college and who do not may be different. For example, many young adults may rely on their parents for financial

support during the transition to adulthood, but the types of financial support that are helpful for those who attend college may differ from the types of financial support that are helpful for those who do not attend college. Lastly, we did not include parental income as a control variable, because a chi-square test of difference indicated that there was no significant difference between the group with parental financial support and the group without financial support. Future research would benefit from using multiple indicators of family financial status such as mother's education, father's education, family income, family net worth or family economic stress as predictors of young adults' financial attitudes, financial behaviors, financial well-being, and overall happiness. This is particularly important because family resources may constrain financial behaviors.

This research offers two important unique findings. First, young adults' healthy financial attitudes, financial behaviors, and financial well-being emerge not only from parental financial socialization practices, but also from general qualities of relationships between parents and young adult children. Second, young adults' financial activities affect their overall subjective well-being, not only their financial well-being. Examining these associations simultaneously within one model revealed that young adults' financial behaviors mediate associations between the parent-child relationship qualities and overall happiness. Therefore, financial counsellors and educators should know that financial education and financial socialization help to enhance young adults' subjective well-being ultimately, and qualities of relationships with parents play important role. We believe that parents should be educated about the importance of relationship quality with their children, and it is possible to influence young adults' healthy financial activities. Parents also need to understand that their choice to provide financial support can help their children feel more confidence from their own financial achievement.

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Promoting self-reliance through the enhancement of creativity in home economics students in higher education institutions for sustainable development

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Abstract

Creativity is very crucial for individuals to achieve self-reliance for sustainable development. This study was a descriptive survey designed to determine strategies for enhancing creativity in Home Economics (HE) students in higher education institutions in Nigeria, so as to promote self-reliance, and sustainable development. Specifically, the study ascertained, the benefits of developing creativity, obstacles to enhancing creativity, activities that can stimulate creativity, and ways of promoting creativity in HE students.

Four research questions and two hypotheses guided the study. The population comprised 185 HE lecturers and students in higher education institutions in Imo and Abia States, South Eastern Nigeria. Questionnaire was used for data collection, while descriptive statistics (mean) and t-test were used for data analysis.

Results showed that benefits of developing creativity include; enhancement of skill acquisition, promotion of entrepreneurship and self-reliance among others. Results also showed that obstacles to creativity include use of lecture method of teaching that stifles creativity, fear of criticism, insistence on routine ways of doing things, and lack of motivation by teachers among others. Several activities that can stimulate creativity and ways of promoting creativity were also determined. t-test analysis showed no significant difference in the mean responses of the HE lecturers on the obstacles and enhancing creativity in the students.

The study concluded that there is serious need to enhance creativity in HE students for them to succeed in entrepreneurship and be self-reliant. The study thus recommended that HE practitioners should adopt the strategies identified by this study and make deliberate efforts to foster creativity among students to enable them become self-reliant upon graduation considering the high level of unemployment in the country. The study also recommended that HE lecturers should encourage divergent and flexible thinking in their students, and use more of learner centered teaching methods in teaching to enhance creativity in the students.

Keywords: Home Economics, creativity, sustainable development, self-reliance, higher education

Introduction

The alarming level of unemployment in Nigeria necessitates that education for self-reliance should be the main thrust of the educational system. As a broad discipline, whose central theme is the well being of individuals, helping them attain a useful and satisfying life, and be self-reliant, Home Economics obviously needs to rise to the challenge of producing 'job creators' instead of 'job seekers'. This need for HE to produce self-reliant individuals is even more imperative currently, considering the high level of unemployment particularly among young persons and women across nations. Pendergast, McGregor and Turkki (2012) rightly noted that the Home Economics profession is an important part of the future of humankind. Certain skills have been noted to be very essential in the production of self-reliant individuals. These include among others, creativity and problem solving skills.

Creativity has been described as the production of novel and appropriate solutions to open-ended problems in any domain of human activity (Amabile, 1997). Gardner (1993) opined that it is ability to solve problems, fashion products, define new questions in a domain, or in a way that is the usually considered novel, but ultimately becomes accepted in a particular cultural setting. Onu and Ikeme (2008) stated that creativity includes ability to generate new ideas, flexibility as opposed to rigidity, associate and link facts, and brainstorm, analyze and incubate. Pink (2005) repeating arguments posed throughout the 20th century argues that we are entering a new age where creativity is becoming increasingly important. Pink added that we need to foster and encourage right-directed thinking (representing creativity), over left-directed thinking (representing logical, analytical thought).

Recently, creativity appears to be receiving a lot of attention, especially as it is seen as a critical success factor for organizations and individuals alike (Basadur & Hausdorf, 1996). Due to the perceived great importance of creativity in the lives of individuals, calls have been made for the establishment of a Creativity University, to focus on the teaching and nurturing of the art and skills of creativity (Duderstadt, 2000). Research has proven that creativity is a teachable and learnable skill (Scott, Leritz & Mumford, 2004). Sefertzi, (2000) argues that creativity is not an innate quality of only a few selected individuals. It is present in everyone. It can be learned, practiced and developed by the use of proven techniques for enhancing and stimulating creative abilities. Because it is a factor of nurture as well as nature, creativity can be developed, sharpened, and amplified.

Furthermore, Anyakoha, (2009) remarked that creativity is vital to sustainable development adding that it involves developing problem solving skills, evolving new technologies and new ways of solving problems. Moreover, technology is advancing our society at an unprecedented rate and creative problem solving is needed to cope with the challenges as they arise and thus ensure sustainable development. Of special importance is the role that educational system can play in promoting creativity. Presently, the HE education delivery system in higher education institutions in the country is stifling of creativity. Despite the fact that the profession is skill-loaded and has the capacity to equip individuals with saleable skills for self-reliance, regrettably however, lack of creativity hinders acquisition of these skills. Similarly, although the higher education HE programmes currently teach Entrepreneurship education to the students, however, lack of creativity hinders the development of ideas and initiatives necessary for entrepreneurship. Many entrepreneurship scholars have acknowledged that

creativity is an essential aspect of entrepreneurship arguing that it is the start point for the creation, and main factor for achieving success in entrepreneurship (Tu & Yang, 2013; Ward, 2004). It is one of the major qualities of an entrepreneur. Onu (2006) equally observed that creativity seems to be the fundamental premise and the genesis of entrepreneurial activity. Creativity is thus vital for success in entrepreneurship.

The need to enhance the development of creativity among Home Economics students, representing important part of the future of the mankind (Pendergast et.al.2012), cannot be over emphasized. In addition to enhancing the development of creative skills, the students should be encouraged to channel the skills towards productive activities. This will positively impact on the physical, mental, psychological, social and moral life of these young people. To enhance creativity, three components are considered to be notably important. These are (a) expertise (involving technical, procedural and intellectual knowledge), (b) creative thinking skill (flexible approach to problems), and (c) motivation (most especially intrinsic motivation) (Amabile, Barsade, Mueller & Staw, 2005). Home Economics traditionally equips learners with expertise (technical, procedural and intellectual knowledge) necessary for self-reliance. However, promoting intrinsic motivation and flexible approach to problem solving are two areas where HE educators need to intensify efforts in order to enhance creativity in the students. Individuals are more creative when they see a task as intrinsically motivating. Thus to promote creative thinking, Home Economics educators should strive to identify what motivates their students and structure teaching and learning around such. Candy (1997) added that the main objective of creative thinking is to think beyond existing boundaries, to awake curiosity, to break away from rational, conventional ideas and formalized procedures, to rely on the imagination, the divergent, and to consider multiple solution and alternatives.

Teaching students to strive to solve problems that do not have well defined answers is another way of enhancing creativity. This can be accomplished by allowing students to explore problems and re-define them, possibly drawing on knowledge that at first may seem unrelated to the problem in order to solve it. Thus, necessarily, sharp distinction must be drawn between convergent and divergent thinking. While convergent thinking aims at a single, correct solution to a problem, divergent thinking on the other hand, involves creative generation of multiple answers to a set of problems (Cropley, 1998). In spite of the important role of the teacher in enhancing creativity in students, it has been observed that many essential attributes of creativity are most often discouraged in the typical school classroom (Gomez, 2007). Furthermore, Milton (2002) lent support to the above fact stating that perhaps the greatest deterrent to creativity is the conventional college teacher and of course poor teaching methods. Ukoh-Aviomoh (2005) noted that to teach creatively, teachers should use a variety of instructional materials and techniques, engage in series of research in order to be adequately equipped to deliver their lessons creatively, and provide learners with opportunities to learn beyond the classroom. Ukoh-Aviomoh added that teachers should employ brain-storming and creative problem solving techniques, teaching the students how to generate unusual ideas, encouraging acquisition of domain-specific knowledge. Establishing a class environment that accepts and reinforces new ideas is another great way of encouraging creativity (Gomez, 2007). The researchers in this study believe that the absence of creativity among students and graduates is an impediment to self-reliance and sustainable

development, which if not tackled, would continue to increase the incidence of unemployment and poverty in the country and even globally.

Notably, creativity is important for family sustainability and survival. An appreciable number of individuals and families still live in abject poverty despite the target of the Millennium Development Goals (MDGs) towards poverty reduction by the year 2015. For individuals and families to overcome the numerous challenges that emanate from poor living conditions, creativity is absolutely necessary. It is needed to think out solutions to the problems and implement such decisions successfully (Anyakoha, 2009). In addition to helping with problem solving, creativity can assist HE students identify problems even where others have failed to do so.

It is against this background that this study set out to determine strategies for enhancing creativity in Home Economics students in higher education institutions in Nigeria in order to promote self-reliance and sustainable development.

Objectives of the Study

The main purpose of this study was to determine strategies for enhancing creativity in Home Economics students in higher institutions to promote self-reliance and sustainable development. Specifically, the study ascertained the following:

- benefits of developing creativity in the Home Economics (HE) students.
- obstacles to enhancing creativity in HE students,
- activities that can stimulate creativity in the students, and,
- ways of enhancing creativity in the HE students.

In line with the specific objectives above, four research questions and two hypothesis guided the study.

Methods

Research Design

The study adopted a descriptive survey research design. Survey researches typically employ interview and questionnaires to determine the opinions, perceptions, and attitudes of people about issues. This study adopted this design since it sought the opinions of HE lecturers and students on strategies for enhancing creativity in the students.

Area of the Study

The study was carried out in higher education institutions that offer Home Economics programme in two states (Abia and Imo states) in South-eastern part of Nigeria.

Population for the Study

The population for the study comprised all the HE lecturers and students in higher education institutions in the area of study offering Bachelor degree in Home Economics. Records showed that there were a total of 30 lecturers and 155 students in these institutions as at the time of the study, giving a total of 185 respondents. Since the population size was manageable, the entire population was used for the study, hence no sampling was done.

Instrument for Data Collection

A structured questionnaire designed by the researchers was the instrument used for data collection. The questionnaire was divided into sections according to the four specific objectives/research questions. Responses to the items in the questionnaire were based on a four-point likert type rating scale, ranging from Strongly agree (SA) (4points), to Agree (A) (3points), Disagree (D) (2points), and Strongly disagree (SD) (1point).

The instrument was duly validated by three lecturers (2 from Home Economics Department and 1 from Educational Psychology Department). Reliability of the instrument was ascertained using Cronbach Alpha, which is noted to be appropriate for establishing reliability of multiple scored items. The coefficient of alpha for each of the clusters were as follows; cluster A (benefits) = 0.94, cluster B (obstacles) = 0.97, cluster C (activities) = 0.94 and cluster D (strategies) = 0.97, signifying very high reliability. The over-all reliability coefficient of the instrument was 0.98.

Data Collection

The copies of questionnaire were administered by the researchers by direct contact method. Since the researchers worked in the institutions used for the study, it was easy to administer and retrieve the copies of the questionnaire without losing any. Thus, there was 100% return of the questionnaire, and were duly used for data analysis.

Data Analysis

- a. Descriptive statistics (mean and standard deviation) were used for data analysis. A mean of 2.50 was used as the benchmark for decision making for each item, since a four-point rating scale was used for the study. Thus any item with a mean of 2.50 and above was considered as accepted by the respondents, while any item with a mean below 2.50 was considered as unaccepted by the respondents.
- b. t-test was used to test the differences between the mean responses of the lecturers and students at $P < 0.05$.

All computations were carried out using the Statistical Package for Social Science (SPSS), version 22.0 (SPSS, 2013).

Results

One hundred and eighty five respondents completed the questionnaire. The mean ratings of the respondents (both the HE lecturers and students) on each of the items in the

questionnaire were computed. The results are presented in the tables according to the four research questions and two hypotheses that guided the study.

Research Question 1

What are the benefits of developing creativity in Home Economics (HE) students?

Results in Table 1 show that all the respondents accepted that all the 10 benefits of developing creativity in the HE students perceived by the study are indeed important benefits. This is because all the items had mean ratings above 2.50 which is the benchmark for decision making (accepting or rejecting an item). Notably, two of the items (nos. 1 and 2) seemed to appeal more to the respondents with high mean ratings of 3.74 and 3.71 respectively.

Table 1 Respondents mean ratings on the benefits of developing creativity in the Home Economics (HE) students (N=185)

S/N	Benefits of developing creativity in HE students	X	SD	Decision
1	It will tremendously enhance skill acquisition	3.74	0.489	Accepted
2	It will encourage divergent/flexible thinking in the students	3.71	0.543	Accepted
3	It will assist students to cope with technological advancement	3.48	0.609	Accepted
4	It will promote development of initiatives necessary for entrepreneurship	3.58	0.595	Accepted
5	It will help the students develop their personality traits	3.51	0.609	Accepted
6	It will facilitate critical thinking in the students	3.35	0.699	Accepted
7	It will tremendously reduce unemployment	3.58	0.565	Accepted
8	It will help in poverty reduction	3.55	0.633	Accepted
9	It is crucial for self-reliance	3.50	0.652	Accepted
10	It will enhance sustainable development	3.29	0.800	Accepted

X = Grand mean, SD = Standard Deviation

Research Question 2

What are the obstacles to the enhancement of creativity in HE students?

Table 2 shows that all the 11 perceived obstacles to enhancement of creativity in HE students are actually hindrances to development of creativity in the students. Invariably, the 7th item (use of lecture method of teaching that stifles creativity) was considered the greatest obstacle to creativity as it recorded the highest mean rating of 3.49.

Table 2 Respondents mean ratings on the obstacles to the enhancement of creativity in HE students (N=185)

S/N	Obstacles to enhancement of creativity in HE students	X	SD	Decision
1	Lack of self-confidence by students.	3.29	0.800	Accepted
2	Lack of interest on the part of the students.	3.32	0.715	Accepted
3	Pessimism or negative attitude or thinking.	3.27	0.782	Accepted
4	Lack of motivation by teachers.	3.26	0.814	Accepted
5	Lack of conducive learning environment.	3.43	0.712	Accepted
6	Insistence on rigid/routine ways of doing things.	3.48	0.609	Accepted
7	Use of lecture method of teaching that stifles creativity.	3.49	0.732	Accepted
8	Sex-role stereotype.	3.37	0.734	Accepted
9	Fear of criticism.	3.36	0.762	Accepted
10	Demand for quick production of results.	3.34	0.798	Accepted
11	Hectic schedule that doesn't provide time for reflection.	3.39	0.767	Accepted

X = Grand mean, SD = Standard Deviation

Research Question 3

What are the activities that can stimulate creativity in HE students?

Results in Table 3 show that the respondents accepted all the eight items outlined in the study as activities that can stimulate creativity in HE students. This implies that all the items are potential stimulants of creativity in individuals. It is significant to note that item 2 (innovative and entrepreneurial activities) recorded the highest mean rating (3.78), signifying that creativity and innovation/entrepreneurship are closely linked.

S/N	Activities that can stimulate creativity in HE students	X	SD	Decision
1	Inventive and ingenious activities	3.49	0.572	Accepted
2	Innovative and entrepreneurial activities.	3.78	0.474	Accepted
3	Challenging activities that require problem solving initiative.	3.53	0.608	Accepted
4	Brainstorming sessions/activities	3.72	0.483	Accepted
5	Forming collaborative, creative groups.	3.44	0.826	Accepted
6	Reading books that can boost creativity.	3.56	0.569	Accepted
7	Generating ideas and transforming them into something of value.	3.42	0.844	Accepted
8	Teaching with variety of instructional materials/resources.	3.57	0.681	Accepted
9	Activities that involve discovery and exploration methods.	3.64	0.538	Accepted

X = Grand mean, SD = Standard Deviation

Research Question 4

What are the strategies for enhancing/promoting creativity in HE students?

Results of the study in Table 4 above indicate that all the 13 strategies suggested in the study are appropriate measures for promoting/enhancing creativity in HE students. This is obvious

as all the 13 items recorded mean ratings above 2.50 which is the benchmark for accepting or rejecting an item.

Table 4 Respondents mean ratings on strategies for enhancing creativity in HE students (N=185).

S/N	Strategies for enhancing creativity in HE students	X	SD	Decision
1	Encouragement of divergent/flexible thinking in students	3.51	0.802	Accepted
2	Students should be engaged in practical classes and assignment.	3.54	0.814	Accepted
3	Students should be encouraged to develop positive self-esteem.	3.56	0.529	Accepted
4	Entrepreneurship education should be intensified.	3.51	0.700	Accepted
5	Large classes should be split into smaller group to give each student freedom to express him/herself.	3.41	0.817	Accepted
6	Increasing the ICT capabilities of the HE students and their teachers should be increased.	3.29	0.938	Accepted
7	Promoting intrinsic motivation and flexible approach to problem solving.	3.31	0.729	Accepted
8	HE students should regularly be exposed to excursions and exhibitions.	3.28	0.825	Accepted
9	Assessments should be based not only on written tests and evaluations but also on exhibition of creative abilities.	3.36	0.740	Accepted
10	Student's ideas/opinions should be respected and not dismissed with a wave of hand.	3.32	0.745	Accepted
11	Students centred methods of teaching and learning should be adopted.	3.34	0.852	Accepted
12	Parental encouragement.	3.44	0.792	Accepted
13	Discouragement of gender stereotyping such that students will be encouraged to tryout a wide range of activities despite their sex.	3.30	0.768	Accepted

X = Grand mean, SD = Standard Deviation

Hypothesis 1

There is no significant difference in the mean responses of HE lecturers and students on the obstacles to enhancement of creativity in the HE students.

The t-test was used to test this hypothesis, and the results are presented in Table 5 below.

The results of the t-test analysis in Table 5 indicated that all the items had calculated t-values below the table t-value of 1.96 at 0.05 level of significance. This implies that there was no significant difference between the mean responses of the HE lecturers and students on the obstacles to enhancement of creativity in HE students. Therefore, the null hypothesis (Ho1) was upheld.

Table 5 t-test Analysis of responses of HE lecturers and students on the obstacles to enhancement of creativity in HE students (HE lecturers, N1 = 30, HE students N2 = 155)

S/N	Obstacles to enhancement of creativity in HE students	X1	SD1	X2	SD2	t-value	Remark
1	Lack of self-confidence by students.	3.27	0.64	3.33	0.884	0.127	NS
2	Lack of interest on the part of the students.	3.23	0.728	3.39	0.769	0.147	NS
3	Pessimism or negative attitude or thinking.	3.17	0.592	3.25	0.84	0.117	NS
4	Lack of motivation by teachers.	3.1	0.712	3.29	0.773	0.106	NS
5	Lack of conducive learning environment.	3.23	0.679	3.46	0.758	0.177	NS

6	Insistence on rigid/routine ways of doing things.	3.53	0.629	3.34	0.742	0.143	NS
7	Use of lecture method of teaching that stifles creativity.	3.47	0.73	3.67	0.636	0.282	NS
8	Sex-role stereotype.	3.27	0.828	3.41	0.787	0.149	NS
9	Fear of criticism.	3.33	0.661	3.22	0.955	0.088	NS
10	Demand for quick production of results.	3.3	0.794	3.33	0.884	0.125	NS
11	Hectic schedule that doesn't provide time for reflection	3.2	0.761	3.35	0.843	0.132	NS

X1 = Mean of N1, X2 = Mean of N2, SD1 = Standard deviation of N1, SD2 = Standard deviation of N2, P<0.05, NS = Not Significant

Hypothesis 2

There is no significant difference in the mean responses of HE lecturers and students on the strategies for enhancing creativity in the HE students.

Table 6 similarly shows that all the outlined strategies for enhancing creativity in HE students had calculated t-values below table t-value of 1.96 at 0.05 level of significance. This implies that no significant difference exists between the mean responses of the HE lecturers and students on strategies for promoting/enhancing creativity in the HE students.

Table 6 t-test Analysis of responses of HE lecturers and students on the strategies for enhancing/promoting creativity in HE students (HE lecturers, N1 = 30, HE students N2 = 155)

S/N	Strategies for enhancing creativity in HE students	X1	SD1	X2	SD2	t-value	Rmk
1	Encouragement of divergent/flexible thinking in students.	3.83	0.379	3.5	0.715	0.197	NS
2	Students should be engaged in practical classes and assignment.	3.83	0.379	3.28	1.037	0.158	NS
3	Students should be encouraged to develop positive self-esteem.	3.40	0.724	2.92	0.932	0.212	NS
4	Entrepreneurship education should be intensified.	3.77	0.430	3.54	0.584	0.232	NS
5	Large classes should be split into smaller group to give each student freedom to express him/herself.	3.77	0.430	3.34	0.856	0.144	NS
6	Increasing the ICT capabilities of the HE students and their teachers should be increased.	3.60	0.498	3.33	0.861	0.134	NS
7	Promoting intrinsic motivation and flexible approach to problem solving.	3.60	0.498	3.58	0.623	0.168	NS
8	HE students should regularly be exposed to excursions and exhibitions.	3.67	0.479	3.45	0.961	0.143	NS
9	Assessments should be based not only on written tests and evaluations but also on exhibition of creative abilities.	3.50	0.509	3.35	0.745	0.16	NS
10	Student's ideas/opinions should be respected and not dismissed with a wave of hand.	3.50	0.509	3.24	0.876	0.129	NS
11	Students centred methods of teaching and learning should be adopted.	3.63	0.490	3.54	0.732	0.143	NS
12	Parental encouragement.	3.67	0.479	3.44	0.883	0.132	NS
13	Discouragement of gender stereotyping such that students will be encouraged to tryout a wide range of activities despite their sex.	3.60	0.498	3.32	0.967	0.106	NS

X1 = Mean of N1, X2 = Mean of N2, SD1 = Standard deviation of N1, SD2 = Standard deviation of N2, P<0.05, NS = Not Significant

Discussion

The results of this study clearly attest to the high level of importance attached to the development of creativity in HE students. All the 10 benefits of developing creativity outlined in the study were accepted by the respondents, with majority of the items recording quite high mean responses above 3.50. This is a clear indication that this study is timely and findings will greatly assist in preparing HE students for self-reliance. This will significantly reduce the level of unemployment particularly among the young people and women. Consejo Económico y Social (CES) (2011) rightly stated that promotion of creativity and entrepreneurship can help generate job creation while reducing unemployment as well as improving the living conditions of individuals. Two of the outlined benefits that recorded the highest mean ratings are, (a) tremendous enhancement of skill acquisition, and (b) encouragement of divergent/flexible thinking in students. Divergent thinking is often used as a synonym for creativity in psychology literature (Cropley, 1998), and involves creative generation of multiple answers to a set of problems. Onu (2006), Scott et.al. (2004) and Candy (1997) equally noted the important link between creativity and divergent thinking.

The results indicated that the greatest obstacle to enhancement of creativity in HE students as perceived by the respondents is the use of teaching method (lecture) that stifles creativity with a mean rating of 3.49. Milton (2002) remarked that the greatest deterrent to creativity is the conventional college teacher as well as poor methods of teaching. This finding also buttresses the observation by Gomez (2007) that many essential attributes of creativity are discouraged in the typical school classrooms. Thus to enhance creativity, HE lecturers must employ a variety of teaching methods, especially student centred methods that will encourage divergent thinking in students. Lack of conducive learning environment is among the obstacles rated high by the respondents. This is to be expected because Gomez (2007) pointed out that creativity is encouraged by the establishment of a class environment that accepts and reinforces new ideas. Closely related to this obstacle is the insistence on rigid/routine ways of doing things. This is a problem because creativity involves being able to do imaginative and non-routine things, while also building on tradition to achieve profitable outcomes (Fillis & Rentschler, 2010). Moreover, the major objective of creative thinking is to think beyond the existing boundaries, to awake curiosity, to break away from rational, conventional ideas and formal procedures, to rely on the imagination, the divergent, and to consider multiple solution and alteration (Candy, 1997). HE lecturers should thus strive to ensure that there is conducive learning environment that encourages generation of new ideas and solutions to problems as well as giving students freedom to think beyond the existing routine ways of doing things.

Regarding the activities that can stimulate creativity in HE students, the respondents rated innovative and entrepreneurial activities highest (3.78). This is not surprising because the very close relationship between creativity and innovation/entrepreneurship has been emphasized by many scholars (Tu & Yang, 2013; Fillis & Rentschler, 2010; Onu, 2006; Ozioko, 2006; Basadur & Hausdorf, 1996). Creativity is one of the important qualities/characteristics of an entrepreneur. It is regarded as a critical success factor for entrepreneurial activities. Onu (2006) succinctly stated that the fundamental premise and genesis of entrepreneurship is creativity. Brainstorming session/activities were equally rated high by the respondents in this study. This agrees with the views of Candy (1997) who observed that brainstorming is one of

the best known creativity supporting activities and can be used for generating a large number of ideas or solutions. It is one of the most popular techniques used to induce creativity and can enhance an individual's capacity for divergent thinking (Basador & Hausdorf, 1996). Collaborative group activities were rated important in this study, confirming the assertion by Gomez (2007) that creative problem solving in carefully organized group situation is not only effective, but also an economical use of time. Furthermore, reading books that can boost creativity which was accepted as one of the important activities agrees with the views of scholars who argued that creativity can be learned, developed, sharpened and amplified because it is a factor of nurture as well as nature (Onu, 2006; Scott et.al. 2004; Sefertzi, 2000; Csikszentmihalyi, 1999).

Results of the study in Table 4 indicate that encouraging students to develop positive self-esteem, engaging student's adequately in practical classes and assignments, encouraging divergent and flexible thinking, as well as promoting intrinsic motivation in the students were the most highly rated strategies for enhancing creativity in HE students. Supporting the above, Amabile et al. (2005) noted that among the important components for creativity enhancement include, (a) expertise (technical, procedural and intellectual knowledge), (b) flexible approach to problem solving and (c) motivation, especially intrinsic motivation. Promoting intrinsic motivation (that motivation which comes from inside the individual for instance, from satisfaction, enjoyment of work etc) is obviously an important area where HE educators can foster creativity in students. This is true because individuals are more creative when they see a task as intrinsically motivating and valued for its own sake.

Other creativity enhancement strategies established by this study include intensification of entrepreneurship education, splitting of large classes into smaller groups to allow students freedom to express themselves better, and regular exposure of students to excursions and exhibitions. Furthermore, parental encouragement, increasing ICT capabilities of HE lecturers and students, and adoption of student centered methods of teaching were equally established as plausible strategies for creativity enhancement. The home is the first learning environment of every individual, and parents, especially mothers are the first teachers of children and as such have very important role to play in fostering creativity. Parents should plan creative activities and provide opportunities for their children to develop creative mind right from their tender years, through their school age and adolescence for sustainability. Candy (1997) noted that several computer-based creativity supporting techniques are available. Increasing the ICT capabilities of HE lecturers and students will assist them benefit from these resources for enhancing their creativity. Use of the traditional teaching methods (teacher centered/lecture method) in teaching and learning has been described as one of the greatest deterrents to creativity (Milton, 2002). For HE students to develop creative skills, learner or student-centered methods which incidentally are in line with global best practices should be adopted to foster creativity in the students. Ukoh-Aviomoh (2005) added that to teach creatively, teachers should use a variety of instructional methods and materials, engage in series of research to equip themselves properly for creative delivery, and provide learners opportunities to learn beyond the classroom.

t-test analysis of the responses of HE lecturers and students on the obstacles to enhancement of creativity indicated no significant difference at $P < 0.05$, as all the calculated t-values were

below the table t-value of 1.96. The hypothesis was upheld. This implies that all the obstacles identified in this study are actually considered hindrances to enhancement of creativity in HE students by the two groups of respondents. Similarly, the t-test analysis of the second hypothesis regarding the responses of HE lecturers and students on the strategies for enhancing creativity indicated no significant difference, with all the calculated t-values being below the table t-value of 1.96 at 0.05 level of significance. The second hypothesis was also upheld, signifying that all the strategies suggested in this study are appropriate for enhancing creativity in HE students.

Conclusion

The level of importance attached to the promotion of creativity in learners is quite high. However, the enabling environment and teaching methods that can stimulate creativity in students urgently need to be established and encouraged. Creativity is very important for enhancing skill acquisition, promoting entrepreneurship and self-reliance and development of divergent thinking in HE students. Major obstacles to creativity are use of lecture method of teaching, insistence of rigid, routine ways of doing things, lack of motivation and fear of criticism. Innovative/entrepreneurial activities and brainstorming sessions can tremendously enhance creativity in students. To achieve the professions objective of producing self-reliant individuals, there is serious need for HE to adopt the strategies to enhance creativity in their students for them to succeed in entrepreneurship and other ventures, for sustainable development.

Recommendations

- a. HE practitioners should embrace the strategies identified by this study to foster creativity among their students to enable them become self-reliant upon graduation.
- b. HE lecturers should encourage divergent and flexible thinking in their students, and desist from insisting on previous routine established way of doing things.
- c. Learner-centred teaching methods should be utilized in teaching to encourage creative thinking in the students. This is in line with global best practices in teaching and learning.

Biography

Dr Stella N. Lemchi is a lecturer and currently the Head of the Department of Home Economics, Alvan Ikoku University of Education, Owerri, in Nigeria. She has been teaching Home Economics for more than 20 years and her main research and teaching interests include Clothing and Textiles, Entrepreneurship education, Food and Nutrition and Home Economics education policies. She belongs to several professional bodies including the Home Economics Research Association of Nigeria (HERAN), and the International Federation for Home Economics (IFHE). Her E-mail address is lemchistella@gmail.com.

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Exploring Modality in Home Economics Discourse: Will, Can, Might, Should

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Abstract

This paper explores modality in home economics discourse and the power of modal verbs. Modality (mood) entails using grammar (i.e., main verbs and modal verbs) to convey one's feelings about something being proposed. After explaining modality, modal verbs, modal force (certainty, possibility, and obligation), and modal flavour, the paper reports the results of an exploratory study of the presence of modal verbs and modal force in the Journal of Family & Consumer Sciences. The assumption was that by determining the modal force, the author's conviction about what is being proposed can be inferred. A content analysis of the recommendation, conclusion, and implication sections of 127 articles from the last five years (2011-2015 inclusive) (with an 80% intra-reliability coefficient), yielded 345 instances of modal verbs, with the most common being should, can, could and need to (64%). Analyzed using descriptive statistics, results showed that home economics authors mainly employed the possibility modal force (47%), followed by obligation (35%), and then certainty (18%). A detailed discussion explored the import of these results. Although the study did not measure consciousness of verb choice, the paper concludes that, with modal awareness, home economists are more likely to choose the best modal verb to communicate their attitude (mood) about their idea; that is, their conviction, commitment, determination (resolve), or detachment. Consciously choosing modal verbs will ensure that home economists manifest power and influence in their practice, thereby enhancing the profession's legitimate impact in society.

Introduction

"Public policy makers *might* make home economics courses mandatory for all grade levels."
"Public policy makers *must* make home economics courses mandatory for all grade levels."
Which message resonated with you? Why do you think that is so? It is the power of modal verbs. *Might* means there is a possibility, and *must* means logically necessary. The choice of modal verb (e.g., *should, could, will, may*) is crucial to getting one's message across. What is being said (dictum) is one thing, but how it is being said (modality) is another. Modality is a linguistic means by which the speaker can express their attitude toward the proposed idea (Dury, ca. 2000). This paper is about modality in home economics (family and consumer sciences, human ecology, human sciences), and the power of modal verbs in our discourse. Words are never neutral. They carry power. They reflect the interests, desires, beliefs, and attitudes of those who speak, whether the speaker is aware of it or not (McGregor, 2004). Unless modal verbs are consciously chosen, the words of home economists may lose their power.

Home economists conduct research, engage in program evaluations, analyze policy, and critically examine societal trends so they can effect change. Their suggestions for future actions can be articulated in the discussion, conclusion, implication and/or recommendation sections of their reports or in oral presentations. They tend to say that someone *should*, *could*, *must*, or *might* take some future action. Whether they know it or not, these verbs convey their conviction relative to their recommendation. And, whether intentionally chosen or not, if properly understood, readers or listeners can infer from the modal verb the attitude of the author making the point, and then accept or reject their supportive argument (Megat Khalid, 2013).

Discourse involves both the speaker and the listener. Regarding the power of modal verbs, two things are at play. The first is whether authors are aware of the message being conveyed by their choice of modal verb. How often do home economists communicate their intended messages by consciously choosing a modal verb? Conversely, how often do they inadvertently communicate the wrong or unintended message with a seemingly innocuous grammatical choice? The second issue is whether the reader or listener is savvy enough to appreciate the intended message. Even if an author chooses a modal verb on purpose, that choice may go unnoticed. As an example, an author may be chastized for using *must* too often, with journal editors and peer reviewers advising her to ‘tone down the message,’ when in fact she intended to say *must* because she was so convinced about her message. *Must* was the best verb to convey her mood when writing, but it was mistakenly interpreted as preachy and prescriptive. This is referred to as the “agent-controlled interpretation” of modal verbs (Salkie, Busuttil, & van der Auwera, 2009, p. 63).

When used properly, modal verbs help authors express the force of their argument (Hacquard, 2011). Force means strength, power, influence. Home economists strive to be a force that shapes family and individual well-being and quality of life; hence, the force of their words matters. In light of this fact, the research questions guiding this study are (a) What modal verbs are home economists using in their discourse? and (b) What can be inferred or deduced from this information? These research questions are informed by several assumptions. First, the conscious choice (or inadvertent use) of modal verbs shapes impressions of the profession and discipline. Second, home economics discourse affects how society perceives and receives our suggestions for change and calls for action, meaning the words we use have power. Third, home economics will benefit from the conscious choice of the modal verbs when making recommendations for change.

On a personal note, my 30-year experience as associate editor, editor, and peer reviewer prompted this study. Too often, I would read a strong study but observe that the authors did not speak from a point of conviction about the import of their results or findings. The discussion and conclusion sections were instead peppered with *might* and *could*. I interpreted this as doubt and uncertainty about what was being proposed, or the possibility of it ever happening. I knew the scholarship was sound. So, I questioned why they did not speak from a position of authority on their own research. I decided to explore this phenomenon; hence, this exploratory study.

This paper contains two literature review sections. The larger section deals with modality and related concepts. It was used to help prepare the research design for the study (data collection and analysis, as well as interpretation). The smaller review focused on the nascent literature containing comparative studies pertaining to other profession's concerns with modality in their discourse, and modality in academic research in general. This body of literature richly informed the interpretation of the results, and attendant conclusions.

Literature Review of Modality and Related Concepts

The field of linguistics studies three aspects of language: its form, its meaning, and language in context (Halliday & Webster, 2006). This study was interested in the meaning of language as conveyed by verb choice. When people want to express the need for future action, they consciously choose or subliminally select specific main verbs, which include *recommend*, *advocate*, *suggest*, *propose*, *advise*, *urge*, and *counsel*. Modal verbs (also called modal auxiliary verbs) are used in conjunction with these main verbs so as to convey the beliefs, opinions, attitudes, and assertions of the person articulating the idea. A *modal* verb conveys the *mood* of the speaker; that is, how she or he feels about what is being proposed.

Modal Verbs

There are 10 single-word modal verbs: *should* (*ought*), *may* (*might*), *can* (*could*), *would* (*will* and *shall*), and *must* (see Table 1). Technically, they are *auxiliary verbs* (help and support) in that they supplement the main verb by conveying mood and state of mind (Huddleston & Pullum, 2005). Other verbs can be used to convey attitudes and feelings toward the action communicated by the main verb but they are not considered modal verbs. Called phrasal modals, they are linked with the infinitive *to*. Examples include *dare to*, *need to*, *had better*, and *have to* (Gregori, 2011; Huddleston, ca. 2010). These are also called marginal modals compared to *ought*, *could* and so on, which are central modals (Dury, ca. 2000).

Modal verbs are “helping verbs” that gain meaning when a person uses them to add additional information about the main verb in the sentence (Gould, 2011; Gregori, 2011). Consequently, modal verbs have a key communicative function in discourse in that they impart information about the emotions behind the recommendation. They are a very rich area of the English language (Foster, 2015). They convey meanings of certainty (doubt), possibility (probability), and obligation (necessity) (or lack of these) (Gould, 2011). They also convey intent, promise, willingness, and ability (Foster, 2015). And, modal verbs express contingencies, conditionality, commands, and preferences (Kosur, 2012).

Modality

In the field of linguistics, *modal* is another word for mood (i.e., state of mind of the speaker). Linguists consider mood to be a grammatical category. They believe that mood “shades off imperceptibly into *modality*” (Dury, ca., 2008, p. 8), which is defined as “the speaker’s cognitive, emotive or volitive attitude toward a state of affairs” (Keifer as cited in Dury, ca. 2000). The latter can encompass commitment, resolve, detachment, or conviction. *Modality* is the modification of a verb so as to express how an action or state is conceived by the speaker (Kosur, 2012).

Table 1 Modal Auxiliary Verbs Organized by Modal Force, with Examples
(Dury, ca. 2000; Foster, 2015; Gould, 2011; Kosur, 2012; Landry, 1982; University of York, 2007)

Modal force	Auxillary Verb	Definition	Example
Certainty	Will	What we believe to be true about the present (making deductions)	Home economists will make a difference.
	Would	Confidently speaks to an unrealized future	Home economics would become valued and respected.
	Shall	Indicates personal intention	I shall do whatever I can to future-proof the profession.
	Must	What can be inferred or concluded to be a logical interpretation of a situation (do not have all of the facts)	Home economists must help change the world.
	Should	Expresses what may reasonably be expected to happen if everything goes according to plan (making a deduction)	Home economists should be relevant in the next century.
Possibility, Ability and Permission	May	Something will happen or is already happening (about 50% sure)	Home economists may become legitimized.
	May	Refers to things happening in certain situations	If the time is right, home economists may become involved.
	Might	Conveys the possibility of something happening, but is tentative, doubtful (about 30% sure)	Home economists might want to take stop changing their name.
		Something is possible and can actually happen; indicative of ability	Home economists can become influential political actors.
	Can	Speaks to choice and opportunities	To make a lasting difference, home economists can rethink their role in policy.
		Expresses contingencies	If home economists can learn about globalization, they can better deal with the fallout of the phenomenon.
Obligation and Necessity (presumes freedom to act)	Could	Theoretically, something might be possible, might happen, but not sure; also hypothetical or conditional	Home economics could become a defunct discipline.
	Have to	Expresses a general obligation based on a rule or the authority of another	Home economists have to hold some sort of university credential.
	Need/ need to	Indicates an obligation or necessity to do something	Home economists need to gain leadership acumen.
		Can imply that an external source is required to act, rather than the speaker	Consumers need to be protected by governments.
	Must	Expresses a strong obligation of what must happen (often prescriptive and preachy)	Home economists must have a personal and professional philosophy.
Should/ ought to	Refers to obligations where people have a choice	Home economists should be active in public policy.	

Applying rules of grammar, writers and speakers use modal verbs to convey the mood of the main verb. For example, if the main verb is *recommend*, and the speaker wants people to know she thinks it is imperative that the recommendation be embraced, she can choose *must* or *should*. “It is *recommended* that home economists *must* remain conversant of global dynamics.” Kosur (2012) explained that “modality is the grammaticalized expression of the subjective attitudes and opinions of the speaker” (p. 1). Said another way, *modality* refers to speakers or writers using grammar (i.e., verbs and modal verbs) to convey their feelings about something.

Modal verbs modify a verb in such a way that readers or listeners can glean the state of mind of the writer or speaker (von Fintel, 2006). Consider the statements, “I **suggest** that he be there” and “I **suggest** that he *must* be there.” *Suggest* is the main verb, and *must* is the modal verb. *Suggest* means putting the idea forward for consideration. *Must* changes this statement. It indicates the speaker’s feelings about the importance of the other person being there. It further conveys a strong sense of obligation on the person to be there. Modal verbs operate on actions (expressed by verb phrases), and their meanings are determined in relation to the proposed act (Gardenfors, 2005).

Here are some other examples. “I **propose** that all home economics educators *should* learn personal finance.” The tone (mood) shifts when the modal verb is changed. “I **propose** that all home economics educators *might* learn personal finance.” *Should* conveys obligation, and *might* conveys possibility, something to ponder. “Many **recommend** that the profession of home economics *ought to* change its name.” “Many **recommend** that the home economics profession *could* change its name.” While the verb *recommend* conveys the notion that a course of action is being proposed, the modal verb conveys the emotion and the conviction of the person making the recommendation for action. *Ought to* conveys a moral obligation, and *could* conveys possibility (Linguapress, 2015).

In summary, modality is a grammatical tool that enables a speaker or writer to talk about the certainties, possibilities, or necessities of moving beyond a current state of affairs. Linguists hold that modality comprises modal force, and modal flavour. Modal force expresses the strength of the belief, and modal flavour underpins what is shaping that belief (Hacquard, 2011). Each of moral force and modal flavour is now discussed in some detail. Although this study did not measure modal flavour, the concept is briefly described to provide context for the idea of modal force.

Modal Force

Modal force pertains to the expression of three main moods (i.e., the author’s state of mind): (a) level of certainty (likelihood and predictability); (b) degree of possibility, ability, permission; and, (c) sense of obligation and necessity (Palmer, 2001). Respectively, did the author speak from a position of certainty (i.e., no doubt), a position presuming future possibilities, or a moral position? The force of an argument or the articulated position on an issue will affect people’s perceptions of the communication (the statement, message, or prescription). Because the study attempts to gauge which modal force is most dominant in home economics discourse, each of the three modal forces is explained in detail (see also Table 1).

Certainty

Certainty refers to either (a) knowledge that is free of error or (b) the mental state of being without doubt (DeRose, 2011; Westphal, 1995). If people are certain, they express their ideas with assurance, conviction, and confidence. *Psychological certainty* occurs when people are supremely convinced of the truth but are capable of changing their mind in the presence of counterevidence. *Epistemic certainty* (knowledge) pertains to how well someone is able to argue and justify their point. *Metaphysical certainty* refers to whether the person really is right or wrong. And, *moral certainty* occurs when the certainty is sufficient to regulate people's behaviour, despite that the underlying belief may be false (Reed, 2008). Indeed, beliefs (true without proof) are a core concept underpinning certainty (Firth, 1967; Kratzer, 2012).

Anticipating skepticism (others' doubt and disbelief), authors must be certain of their argument (DeRose, 2011; Westphal, 1995). Skeptics will critically examine whether the knowledge tendered, propositions offered, and perceptions created by an author are believable and true. Authors can use three modal verbs to express different levels of certainty: *will*, *must*, and *would* (Simon, 2013) (see Table 1 for definitions). *Will* conveys the most certainty. *Must* hints at a logical conclusion based on strong evidence. *Would* communicates confidence about the some future eventuality. To be fair, authors do not always know how much certainty they are working with because even certainty is rife with uncertainty. People cannot know everything (Rakitov, 1970-1979; Krauss, 2011).

Possibility

People constantly "think and talk about what is not actual but merely possible" (Butchvarov, 1960, p. 329). If something is possible, it has not happened yet but is capable of happening or being achieved. It means people are thinking about something that they are not sure about (Ewer, 1905). Statements of possibility reflect a "blending of ignorance and assurance concerning facts" (Ewer, 1905, p. 8); that is, people proceed from what they know and do not know to the affirmation of a possibility. To clarify, if it is possible, it is *or will* be the case. But if it is necessary (i.e., obligation modal force), it is *and always will* be the case. Respectively, it *might* happen or it will *always* happen (Rescher & Urguhart, 1971).

Possibility is a fundamental modal concept (Chappell, 2006), expressed using *can*, *could*, *may* and *might* (see Table 1 for definitions) (Department of Justice, 2015; Foster, 2015; Gould, 2011; Simon, 2013). Note that *can* conveys capability, while *may* conveys permission. Also, epistemic *must* (certainty) is so strong that it almost forces someone to do something while *can*, *could* and *might* are weaker modal verbs than *must*, showing a lack of commitment or confidence in the proposed idea (the possibility), but are stronger than *may* (Celce-Murcia & Larsen-Freeman, 1999).

Obligation

The non-modal meaning of obligation is a debt of gratitude or a service owed. The modal meaning is to compel someone to do something. Obligation is used when authors want to discuss things that are necessary and important to do, or when they want to give advice about things deemed to be a good idea (Himma, 2013; Huddleston, ca. 2010). Obligations comprise

a recommended act, a reason for the proposed act, reasons for not acting, and a minimum standard of moral responsibility that people are bound to fulfil ((Himma, 2013, 2015, Simon, 2013). There are four modal verbs for obligation: *should*, *must*, *ought to*, and *need* (see Table 1 for definitions).

Although Table 1 speaks for itself, some additional discussion of the four obligation modal verbs is warranted. *Have to* (external) and *must* (internal) represent strong obligations while *should* (internal) is milder. *Should* is used to (a) describe an expected or recommended behaviour or future circumstance, (b) offer advice, or (c) prescribe normative behaviour (without the stronger force of *must* and *have to*). In its deontic use (moral overtones), *must* expresses the author's conviction that others have a strong sense of obligation or necessity to do something (Wikipedia Encyclopedia, 2016).

Also, the force of the obligation is anchored in the targeted audience's current system of values (Brandt, 1964; Leiss & Abraham, 2014). Furthermore, whether an act prefaced with *have to* (a more forceful, external authority) is actually perceived by others as an obligation depends on several things. It must be required by a rule or regulation in a system. That system must recognize and accept the act as a norm, and have the power to make people do it. Regarding the milder obligation (*should*), even if the author feels morally entitled to put forth the case, the reader is not obligated or morally bound to comply (Himma, 2015). There must be some conditions affecting them that make it desirable to act (Leiss & Abraham, 2014). And, sometimes people cannot meet, fulfil or discharge their obligations, despite their best intentions (Brandt, 1964).

In summary, Table 1 profiles the principal ten modal verbs and their alignment with the three main modal forces. Some modal verbs cross over between certainty and obligation (e.g., *must* and *should*) (Simon, 2013). And, each modal verb connotes different degrees of force (strength of belief, attitude, or feelings). People are more likely to heed *will* when it is supported by solid information. They tend to question the use of *might* because it conveys doubt on the part of the speaker. People do not like to be preached to (*must*) but they may be receptive to following dictates from an external authority (*have to*). The author's intended meaning when using particular modal verbs can be inferred by checking paraphrases preceding the modal verb (e.g., it is possible that, if all goes as planned, given what we know) (Dury, ca. 2000). Table 2 provides a truncated overview of the force of an author's argument as indicated by their choice of modal verb (Jordon, 1999; Raimes, 2004; UniLearning, 2000).

Table 2 Range of strength of modal verbs

Modal verbs	Range of strength	Strength of Force
will	strongest/very certainly	Strong and Certain
must/need	very strong/certainly	
should/would/can/ ought to	strong/moderate possibility, probable	Moderate
can/may	stronger/perhaps, quite possibly	Weak and Tentative
could/might	weak inference/low possibility	

Modal Flavour

Modal verbs really do serve as a powerful way to communicate the complexity of the author’s thoughts, with modal flavour a linguistic construct pursuant to this idea. The speaker’s comments and thoughts, and their choice of modal verb, are shaped by modal flavours. This construct concerns the type of interpretation the modal verb expresses. Like flavours of ice cream, modal flavours can be influenced by many things. To illustrate, modal statements can be informed by what authors know, desire, a particular goal, specific rules or regulations, the circumstances, their sense of the world, their own propensity to act, or their disposition. Table 3 profiles 10 common flavours of modal thought (Hacquard, 2011; von Fintel, 2006).

Table 3 Modal Flavours (Dury, ca. 2000; Hacquard, 2011; von Fintel, 2006)

Modal Flavour	Modal Force
Alethic (logic, truth)	the widest sense of the world
Epistemic (know)	a particular body of knowledge (the available evidence; what is known, believed, assumed)
Deontic (duty)	a body of law, rules, regulations or a set of moral principles (morally responsible agents aspire to influence the world)
Teleological (goal)	what means are possible or necessary for achieving a particular goal
Circumstantial (dynamics)	a particular set of circumstances (conditions that influence an event)
Rational (reason)	what is reasonable in a given situation (sensible, fair, reflects sound judgement)
Dynamic (personal)	the person’s own ability, willingness or volition to act
Bouletic (desire)	the person’s desires, hopes, fears, regrets, or wishes
Abilitive (ability)	the person’s physical abilities to act
Dispositional	the person’s disposition (inclination or tendency; a natural or acquired habit or characteristic)

Note: The particular modal flavour (left column) concerns what is certain, possible, permissible, necessary or obligatory (modal force) given... (right column). E.g., Epistemic modality is concerned with what is certain, possible, permissible, necessary or obligatory given the available evidence or what is known.

As with modal force, home economists must be profoundly cognizant of what is shaping their communication; that is, which *flavour* of modality is informing the ideas they choose to communicate? Is their recommendation based on a goal they are trying to reach? Do they have a burning desire to achieve something, and is this wish affecting their recommendation? Perhaps they are wearing a moral hat, trying to cajole readers to accept their idea, opting for *must* when it is not appropriate. Maybe they are so convinced that the data they have support their proposed action, they choose *will* or *may*. Or, their recommendations for change may be constrained by rules or regulations, requiring them to use *have to*. Some home economists have a vision and dream of the profession’s future, inclining them to choose *could* and *can* as a way to convey possibilities. Or, maybe they really did mean that home economists *might* ponder something. After all, *might* is considered to lack modal force. But if the intent was to get people to consider remote possibilities as a springboard to eventually starting something, it is not wrong to choose *might*.

As noted, although this study did not measure modal flavour, the concept was described to help readers appreciate how circumstances and context shape modal force. A home economist's choice of modal verb when preparing the discussion, conclusion, or recommendation sections of their research reports will be influenced by the prevailing modal flavours in their life at the time of writing. Although readers cannot directly discern these influences, they are real. Together, modal verbs, forces, and flavours express a range of subtle meanings (Foster, 2015; University of York, 2007). With degrees of awareness of verb choice or influencing factors (flavours), authors advance one modal form over others, affecting what is implied by or inferred from their communication.

Literature Review on Modality in Academic Discourse

Having reviewed the literature on linguistic conventions around modality, a short review of the nascent literature about modality in academic discourse is now shared. Little literature was found pertaining to how (if) other *professions* are dealing with this phenomenon (except for linguistics and journalism). But it was found to be a concern for the academy in general. To begin, Thompson (2000) concluded that academic writers do not give sufficient attention to the range of functions that modal verbs play in their academic discourse. But they definitely use modal verbs in their work. Carne's (1996) examination of the most frequent words appearing in academic theses revealed that five modal verbs were amongst the top 100 of all words: *may* (position 38), *can* (46), *would* (51), *could* (73), and *will* (81). *Will* and *would* (certainty) appeared least often, and *may* and *can* (possibility) most often. The obligation modal force (*should*, *must*) was not evident in the top 100 words.

Thompson (2001) reported that across journal articles, theses, lecture transcripts, and spoken academic discourse, a pattern of modal verb usage held firm. Academics had a far greater use of *can*, *may*, *could*, and *might* (in that order) than they did *would*, *will*, *should*, and *must* (in that order). That is, they employed the possibility modal force more so than the certainty and obligation forces. Hykes (2000) studied the use of modal verbs among international students and university faculty members (professionals). When writing scientific research articles, faculty members used both *may* and *can* more (possibility force). When using *can*, they communicated indirect, mitigated statements. They used *may* to make unessential comments on the certainty of a proposition. Faculty members used *will* more often than students, intimating more certainty in their ideas. Hykes did not comment on the obligation modal force (*should*, *must*, *ought to*).

An important feature of academic writing is the concept of cautious language, called hedging. This vague language conveys tentativeness or an absence of certainty, especially when authors are trying to express their claims with caution, modesty, or humility (Huschová, 2015). Thompson (2000) reported that academics focus too much on using modal verbs to express tentativeness around the implications of a study (i.e., hedging). Huschová (2015) examined the use of just the possibility modal verbs (*can/could* and *may/might*) in English academic textbooks. His exploratory study of academic discourse determined that scholars used *can* and *may* to convey theoretical possibilities of something happening, but they used *could* and *might* to hedge.

Hinkel (2009) explored the use of modal verbs in university students' essays (specifically, those who had English as either a first or second language). Especially for the latter, he found that a writer's inclination to use the obligation (necessity) versus possibility modal force was affected by (a) the topic, and how closely it related to their cultural norms; and, (b) their access to facts and demonstrable evidence about the topic, in lieu of falling back on their own experience and knowledge. If the topic was culturally-bound, and they knew little about it, they used obligation modal verbs. Also, the closer writers were to the topic, culturally and personally, the higher their usage of obligation force. Possibility modal verbs were less context- and topic-dependent.

Viel (2002) explored modal verb usage in documents used to teach students studying English for Science Technology (EST) and English General Purpose (EGP) (60% of them journal articles). Both groups used modal verbs, but the usage was highest for EST. And, within that corpus (group of documents), he found variation, with some types of documents more likely to include modal verbs than others. For example, journals had the highest frequency, and user manuals the lowest usage, of modal verbs. The most common modal verbs for both groups were *can* (possibility) (40%), and *will* (certainty) (25%). The least common were *should*, *must*, *shall*, *need to* (basically, obligation force) (35%). Explaining that modal substitutes do not technically express modality (e.g., *it is imperative that*), Viel (2002) believed they should be recognized when coding to see if their inclusion affects the results (see also UniLearning, 2000).

Although not about academics per se, Megat Khalid (2013) reported that "it was always possible to detect signs of authorial stance" (p. 461) by assessing journalists' choice of modal verbs. Using modal verbs helped them inject their subjective voice into the stance they were proposing in their newspaper article. Results showed they used *will* to express certainty, *could* and *can* to indicate they knew people may not agree with them, *should* to convey the importance of their proposition, and *must* to indicate their strong belief in their comment. She concluded that journalists depend on modal verbs to make readers aware of and heed their opinions.

Method

Exploratory research helps scholars gain familiarity with or acquire new insights into problems that are in their preliminary stage. The intent of this exploratory study (content analysis) was to examine modality in home economics. First, the study explored which modal verbs were used most often by home economists in a particular data set. Second, those results were analyzed to determine what modal forces were most evident (i.e., certainty, possibility, or obligation). It was assumed that if one can determine the modal force, one can infer the author's conviction about what is being proposed. Results from exploratory studies are not generalizable to the larger population and definitive conclusions are not possible, but insights that emerge can help formulate a more precise problem for future research (Shields & Rangarjan, 2013).

Sample

This exploratory study examined articles from the *Journal of Family & Consumer Sciences* (JFCS). The JFCS is one of two official organs of the American Association of Family and Consumer Sciences (AAFCS). It is the oldest home economics journal in the world (launched in 1909). The JFCS contains four sections where people can share their scholarship. The invited *Feature* section is followed by sections on *Scholarship*, *Practice*, and *Strategies for Success*. The latter three were the focus of this study.

The *Scholarship* section includes original research (basic and applied), program evaluation, issue papers, or theory or philosophical papers. *Practice* papers (not peer reviewed) report on the actual application or use of an idea, belief, or method related to family and consumer science (home economics) practice. The *Strategies for Success* section can contain shorter scholarship papers or a brief (both are peer reviewed). This section contains reports on home economics initiatives designed to achieve a particular objective related to the mission and vision of the profession and discipline. As a caveat, this content analysis did not code for the topics of these papers, which can be gleaned in a general sense from the table of contents.

Often, the sample size for exploratory studies comes down to a best guess based on the researcher's familiarity with the experience (Bell, Holleran, & Ramakrishnan, 2002). To explore modality in home economics, JFCS papers from a five-year time span were analyzed (2011-2015, inclusive). Knowing the publication schedule for the journal, the researcher anticipated that a five-year time frame would yield over 100 articles, more than enough for an exploratory study. This time frame was also chosen for illustrative purposes, in anticipation that future studies will (a) include more volumes and issues from JFCS; (b) expand the data base to include more home economics journals; and, (c) explore other avenues of home economics discourse (e.g., theses and dissertations, conference presentations, keynotes, position papers, policy briefs and documents, working papers, books and book chapters).

Also, modal force questions (Is it certainty, possibility or obligation?) are primarily settled lexically (words and vocabulary) while modal flavour questions are primarily (but not exclusively) settled pragmatically (by discourse context) (Matthewson, 2016). To discern modal force, this study employed a content analysis of words and vocabulary. Future studies could conduct a thematic analysis for modal flavour (an approach that better respects context).

Data Collection

This study employed a content analysis, which involves identifying whether important characteristics (sometimes predetermined) are present or absent in a document (Mycoff, 2016). Authors often use modal verbs to develop the argument in the discussion section of their paper (which can be integrated into the conclusion) (University of Sydney Learning Center, 2007). However, this study analyzed the implication, conclusion, and recommendation sections because authors normally use modal verbs to propose future actions in these sections (Bitchener, 2010). If these three headings were absent in a paper, the researcher turned to the last few paragraphs of the paper and looked for phrases like "the

findings suggest” and “in conclusion.” The paper’s Limitation section was not coded. For clarification, this study did not collect data on modal flavours (see Table 3). It may have been possible to deduce this from the tenor of the text, but doing so would have moved the study beyond the afore noted tenets of exploratory research.

Using content analysis protocol, the sample frame was hand coded for the presence of any of the modal auxiliary verbs in Table 1, which constituted a calculated start list (rather than code-in-use). The coding unit was words (Miles & Huberman, 1984). A coding sheet was developed to code the data for each year (volume). Rows represented issue number for that volume and columns represented the type of paper (i.e., scholarship, practice, or strategy). Row and column frequencies for each code sheet were tallied and compared to ensure internal data consistency.

Stability measures the consistency of an individual’s private understandings of the data (Krippendorff, 1980; Lindkvist, 1981; Weber, 1990). Errors can arise (coder bias) in the form of inconsistencies (noise) in coding, either due to coder fatigue and/or cognitive changes that take place while reading the documents (Holsti, 1969). This study achieved *stability reliability* by taking steps to ensure consistency (minimize bias and errors) when the same coder re-analyzed the same material over a period of time. After the entire sample frame was coded by the author, she recoded a smaller portion to check for coding consistency (Mackey & Gass, 2005). Upon comparing the original and repeated coding results for 20 papers (one issue from each volume, randomly chosen with the roll of a die), it was determined that an 80% intra reliability coefficient was achieved, deemed acceptable for repeated coding by the same person (Krippendorff, 1980). Variation in coding results is expected when conducting studies about modal verb usage in corpora (selected bodies of text) (Viel, 2002).

Coding validity (Did the study measure what it intended to measure?) is more difficult to quantify than reliability in a content analysis (Stacks, 2013); however, a content analysis is valid inasmuch as reliability is adequately accounted for in the research design (Krippendorff, 1980; Weber, 1990), which it was. As a final step, Table 1 was used to help *categorize* the results from the content analysis to determine which modal forces were most often at play (i.e., certainty, possibilities, or obligations).

Analysis

As is common with exploratory research, the data from the content analysis were analysed using descriptive statistics (averages and frequency counts). Descriptive statistics provide simple summaries about the sample, and about the observations that have been made (Mann, 1995). Descriptive statistics allow the analyst to draw conclusions about the *current* data but do not allow conclusions about any population outside of the current dataset (the latter requires inferential statistics) (Mackey & Gass, 2005). Per the latter, Table 1 was used to help determine which modal forces were at play (i.e., certainty, possibilities, and obligations), again reported using descriptive statistics. Inferences about authors’ convictions about the points being made were then deduced from these data.

Results

Sample Frame

The final sample frame comprised five volumes of the Journal of Family & Consumer Sciences (2011-2015 inclusive). The JFCS publishes four issues per year, yielding 20 issues in five years. In total, there were 127 articles in the sample frame (see Table 4), averaging 25 papers per year. For clarification, each issue always has a theme but can also contain non-thematic papers. Two thirds of the sample was Scholarship papers (62%, n=79), followed by Strategies for Success papers (23%), and Practice papers (15%).

Table 4 Profile of Sample Frame of the *Journal of Family & Consumer Sciences* (2011-2015) by Article Type

Year	Scholarship (n=)	Practice (n=)	Strategies for Success (n=)	Yearly total (n=)
2011	16	3	10	29
2012	17	5	6	28
2013	16	5	3	24
2014	18	2	4	24
2015	12	4	6	22
Total	79	19	29	127
%	62%	15%	23%	avg 25

Modal Verbs

Figure 1 contains the results of the content analysis of modal verb usage within home economics discourse in five years of the JFCS. There were 345 instances of modal verbs. The most commonly used modal verbs were *should*, *can*, *could*, and *need to* (averaging 16% each, comprising two thirds of the results, 64%, n=220). *Will*, *would*, and *may* were the second most common modal verbs (n=101, 29%), averaging 9.7 times each. The least common modal verbs were *must* and *might*, averaging 3.5% each (n=12), totalling 7% of the sample.

The sample frame comprised mostly scholarship papers (62%), which is where most of the modal verbs appeared (80%, n=275). The most common modal verbs in the scholarship section were *should* (19%, n=52) and *could* (17%, n=46) (more than one third). The least common modal verbs were *might* (4%) and *must* (4%). *Will*, *would*, *may*, *can*, and *need* appeared on average 31 times each, comprising collectively more than half of the results (56%).

Although authors of practice and strategy papers did use modal verbs, their usage was much less common than in scholarship papers. Practice and strategy papers were the most likely to have none at all. Only 20% (n=70) of the modal verbs were found in these two sections. *Can* was the most common modal verb in these sections (30% n=21). *Will*, *may*, *could*, *should*, and *need* appeared on average 8.5 times each (collectively comprising 61.5%, or one third of the results). The least common verbs were *might* (n=1), *would* (n=2) and *must* (n=3) (8.5%).

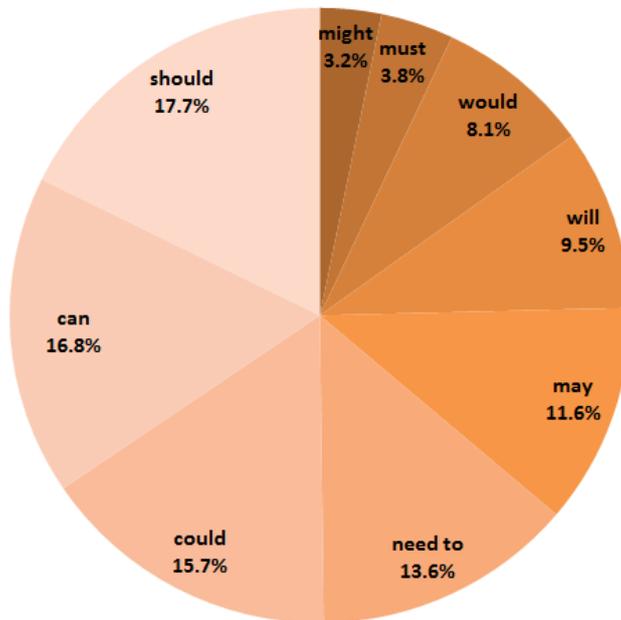


Figure 1 Frequency of Modal Verbs (n = 345) in the *Journal of Family & Consumer Sciences* (2011-2015)

Modal Force

Before calculating the results for modal force, the issue of *must* and *should* had to be addressed. Each of these modal verbs can have both certainty (epistemic) force and obligation (deontic) force (Simon, 2013). Consequently, the data were examined a third time (for instances when *must* and *should* were coded) to discern which modal force was at play. Analysis revealed that *must* and *should* in this data set were used as an obligation modal force rather than a certainty modal force. Regarding *main* verbs, authors said that home economists *must* or *should* (are obligated to): study, examine, focus on, include, explore, identify, take advantage of, stress, design, prepare, investigate, consider, and utilize. In short, when the analyst collapsed the dataset into three modal forces, *must* and *should* were considered obligation, not certainty. That being said, nearly half of the modal verbs constituted the possibility modal force (47%, n=163), followed by obligation (35%, n=121), then certainty (18%, n=61) (see Table 5 and Figure 2).

This pattern held for the type of JFCS paper. Authors of scholarship papers tended to use possibility modal force (45%), followed by obligation (37%), and then certainty (18%). Practice and strategy papers followed a similar pattern: possibility modal force (56%), obligation (28%), and certainty (16%). However, the instance of possibility modal force was slightly higher in practice and strategy papers than scholarship. And, authors of scholarship papers were more inclined to use obligation modal force than were practice and strategy paper authors. The certainty modal force occurred less often for all types of papers.

Table 5 Evidence of Modal Verbs and Modal Force in the *Journal of Family & Consumer Sciences* (2011-2015)

Modal Force	Modal Verbs	n	%
Certainty	Will	33	9.50
	Would	28	8.50
	Total	61	18.0
Possibility	Can	58	17
	Could	54	16
	May	40	11
	Might	11	3
	Total	193	47.0
Obligation	Should	61	17
	Need to	47	14
	Must	13	4
	Total	121	35

N = 345

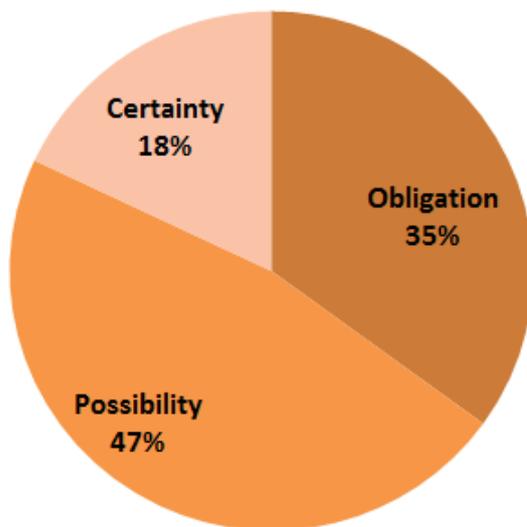


Figure 2 Evidence of Modal Force in the *Journal of Family & Consumer Sciences* (2011-2015)

Discussion

Home economists conduct research, engage in program evaluations, analyze policy, and critically examine societal trends so they can effect change. Their suggestions for future actions are normally conveyed by choice of modal verbs, and modal force. Whether they know it or not, these verbs convey both their conviction relative to the recommendation, and their attitude towards the ideas they are communicating. Bear in mind that any expressed modal force has to be interpreted within the targeted audience’s current system of values (see Brandt, 1964; Leiss & Abraham, 2014).

In this data set, there were 345 instances of modal verbs. As similarly determined by Thompson (2000), home economics academics definitely used modal verbs in their research reports. In this study, authors of scholarship papers used modal verbs more often than did those for practice and strategy papers. Viel (2002) found the same thing, observing variation by type of document within a corpus of documents.

All of the modal verbs in Table 1 were found in the data set except *have to* (external authority). This particular result suggests that home economists tended to posit recommendations for action from their personal and professional authority rather than an external source of authority (see Himma, 2015). This interpretation is supported by Hinkel's (2009) suggestion that closeness to, and familiarity with, the topic and the culture (i.e., the home economics research culture and discipline) inclines authors to use modal verbs indicative of that distance. Not deferring to an external authority implies these particular authors were secure in their professional identity, and felt they had the authority to speak to their peers about pressing issues impacting individuals and families. Relegating responsibility to external authority figures would convey the opposite impression (Vine, 2004).

Type of JFCS Paper

The three different types of JFCS papers had different modal verb profiles (see also Thompson's (2000) results). Authors of scholarship papers were most inclined to use obligation modal force (37%) compared to practice and strategy papers (28%) (see Table 4). This result intimates they had stronger convictions about their research, so much so they used words like *must* and *should* to convince people of the import of their work. Authors of practice and strategy papers were inclined to use modal verbs connoting possibility modal force, which constitutes ideas with the potential to be achieved or brought into existence. This makes sense because these papers, respectively, recount the application of ideas or techniques related to family and consumer science (home economics) practice and initiatives designed to address well-being and quality of life in its broadest sense.

Authors of scholarship papers also heavily favoured possibility (45%) (similar to Hyke's (2000) study). This result suggests that authors understood the limits of their data and methods, dictating a conscious choice not to use the certainty modal force. Conversely, it could be argued that a well-designed study should provide sufficient rigor to prompt authors to speak with conviction. Instead, the certainty modal force occurred less often for all types of papers. This result implies that when drawing conclusions, identifying implications, or making recommendations, few authors in this data set did so with any kind of certainty. Hykes (2000) too found that authors of scientific research papers often used the possibility modal force, making indirect statements about the certainty of their proposition.

Overall, regardless of which type of paper, the majority of authors used the possibility modal force (47%), followed by the obligation modal force (35%), with certainty the least common (18%). Thompson (2001) found the exact pattern. In his study, academic researchers employed the possibility modal force far more often than obligation or certainty. Similarly, Hykes (2000) found that although faculty members used *will* (certainty) more often than students, they used *can* (possibility) most often in their academic writings. The implications of the results for each modal force are now discussed.

Possibility Modal Force

Nearly half (45%) of the authors in the study expressed the possibility modal force, evidenced by their use of *can*, *could*, *may* and *might*. This refers to the capability and potential of coming into existence sometime in the future. This result is supported by Carne's (1996) observation that *may*, *can*, and *could* were in the top 100 words used in academic works. Similar to Huschova's (2015) study, participants in this study used *can* and *may* to convey the possibilities of something happening. Such heavy reliance on this attitude has several implications for home economics practice. In one sense, it speaks to hope and optimism for the profession. Nothing can be possible unless it can be imagined (Ewer, 1905). Raising an issue, and framing it as capable of happening, existing or being achieved, is a stimulus for other professional home economists to take up the cause, to rise to the challenge.

In another sense, it could mean that the authors were still processing the import of their results. Consider that one meaning of possibility is people proceeding from what they know and do not know to an affirmation of a possibility (Ewer, 1905). If an author is not certain of what should happen (given the results of her study or analysis), then she could pose the problem as a possibility for the profession to engage with in the future. Indeed, one theory of possibility is that it is something 'being-thought-about,' and not yet actualized (Butchvarov, 1960).

Another explanation may be that the idea being suggested is near and dear to the author, especially since the possibility modal force (mood) can reflect something close to the author's life (Ewer, 1905). The most common modal verbs for the possibility modal force were *can* and *could* (see Table 5). Expressing the idea that something is possible reflects the author's earnest believe in it, and their attitude that it is worthy of the profession's attention. Huschová (2015) found that academics used possibility modal verbs to convey theoretical possibilities worth exploring.

A final explanation is that by saying *can*, the author conveys her attitude (modal mood) that the possibility of achieving a recommendation or conclusion is contingent on other home economists' abilities, and the choices they make in their practice when opportunities arise. Once the idea has been put out there, everything depends on other home economists. Conversely, the modal *could* means that something is hypothetically possible with degrees of uncertainty as to its actualization. *Could* conveys the author's sense that something is possible but is a more tentative, weaker assertion than *can*. *Could* also means that circumstances mitigate the possibility of something actually happening despite everyone's best intentions, thereby contributing to the unsureness (Simon, 2013). Hykes (2000) confirmed that scholars use *can* and *could* to communicate mitigated statements.

A savvy reader of the JFCS articles in this data set would conclude that nearly half of the authors felt moderately sincere (see Table 3) about the attitudes they were expressing, framing them as possibilities for the future. On the other hand, these same authors likely did the profession a service because if something is not being thought about, it becomes impossible to actualize (Butchvarov, 1960). Placing these ideas on the profession's radar (with the use of *could*) increases the chances of something materializing in the future. Authors seldom used *might*, which is a very tentative assertion. Thompson (2001) also observed a very

low usage of *might* in academic writings. In this study, only a limited number of authors (11%) used *may*, which is a stronger expression of possibility (see Table 5). They opted instead for *can* and *could* (see Thompson (2001) and Viel (2002) for similar results).

Obligation Modal Force

About one third (35%) of the home economists in this study spoke from a position of an obligation modal force (*should, must, need*). This intimates they believed their results warranted them to compel members of the profession to do something in the future (*should*, 17%), that this something was necessary (*need to*, 14%), or both. Very few authors used the strongest sense of obligation, *must* (4%) (see Table 5). Similarly, Carne (1996) found no evidence of high usage of obligation verbs in academic discourse. Thompson (2001) reported them, but they appeared with the lowest usage patterns. Megat Khaqlid (2013) indicated subjects in her study used obligation modal verbs to convey the importance of their ideas, but she did not report frequency data.

Obligation carries moral overtones (Himma, 2015). The choice of the modal verb *should* intimates that authors were (a) expressing personal convictions about an expected behaviour or future circumstance, (b) offering advice, or (c) prescribing normative behaviour for members of the profession (Wikipedia Encyclopedia, 2016). The fact that one third of the authors expressed an obligation moral force is encouraging, but begs the question, 'why so few?' Home economics is a moral enterprise because it is concerned with humans, human interests, and not harming humans. This powerful mandate for professional practice necessitates moral reasoning around choices and actions (Baldwin, 1985). If their results warrant it, home economics scholars should consider embracing and articulating an obligation moral force when writing their conclusions and recommendations. An inferred disinclination to do so suggests that authors in this data set did not hold this attitude as strongly as that of possibilities for potential actions. Carne (1996) did not find evidence of *should* or *must* (i.e., moral overtones) in his study of academic writings either.

Moral obligations come with more force than possibilities; yet, this data set did not strongly exemplify moral force. Authors must provide adequate reasons to support their assertions of moral obligations (Baldwin, 1985; Himma, 2013, 2015), so maybe the authors in this data set did not feel their deductions or inductions merited a moral stance. This has implications because some practitioners need a moral nudge, with some people drawing justification for their actions from supportive research, and a peer authority figure saying 'it ought to be done.' Megat Khalid (2013) felt that readers of others' opinions do pay attention to the *should* comments.

On a final note, despite that an author may feel morally entitled to put forth her case, other home economists are not obligated to comply (Himma, 2015); hence, the need for a sound argument justifying the moral assertion. An interesting anecdotal result is that some authors eschewed modal verbs to convey obligation modal force, opting instead for modal substitutes in the form of infinitive *to* or *that* clauses. Those coded in this data set included: imperative that, important that, timely that, necessary to, urged to, recommended that, critical that, vital that, and encouraged to. These moral assertions are compelling, and warrant attention in any future studies about modality in home economics. None of the literature reviewed for

this paper commented on authors' use of infinitive clauses (i.e., modal substitutes) when conveying the obligation modal force. Viel (2002) did advise that, although modal substitutes do not technically express modality, they should be recognized when coding to see if their inclusion affects the results.

Certainty Modal Force

Very few (18%) home economists in this data set spoke from a position of certainty (evidenced by their equal use of *will* and *would*), see Table 5. Thompson (2001) also found *will* and *would* to be the least used modal verbs in academic writing, and *will* was the least frequently used verb per Carne's (1996) study (*would* was not in his top 100). The choice of *will* suggests that authors fully believed the strength of their deductions, and felt these warranted a strong recommendation. *Would* suggests they felt they could speak confidently to an unrealized future for the profession, or some aspect of practice.

However, such a low incidence of the certainty moral force imitates that the remaining authors (82%) were uncertain, lacking assurance or conviction around the import of their research. Why would so few home economists opt for this modal force? Speaking from a certainty modal force conveys an attitude that if others do what the author recommends, things *will* change. Shying away from this attitude opens the door for other interpretations of the import of the scholarship.

There are several reasons why home economists might shy away from a certainty moral force. Foremost, they may legitimately feel their data and analysis do not warrant a certainty force. On the other hand, perhaps they are not convinced that the profession is ready to take on the proposed challenge, so they offer it instead as a *possibility* for future action or a professional *obligation*. Authors may have had mental reservations about making a full out certainty-based recommendation. Mayhap they were still questioning the rigour of their own research design, not trusting the results to qualify for a certainty modal force. Maybe they were entertaining several interpretive options of the data and were not sure of which one to assert, leading to a hesitation to use such strong words as *will* and *would*. After all, *will* means the author is very sure of her deductions, and *would* means she speaks with confidence about an unrealized future. If an author is not ready to express this strong attitude, she may shy away from the certainty modal force. Viel (2002) also reported low usage of the certainty force (*will*) in academic writing (25%) compared to possibility (*can*) (40%).

What might this inferred lack of conviction say about the force of home economists' recommendations and conclusions? If discerning readers grasp that the certainty modal force is absent in a research report, they may wonder why the author did not speak more forcefully about the importance and implications of their results or findings. This question is important because Thompson (2000) posited that academic writers too often use modal verbs to hedge, rather than speak with conviction. Megat Khalid (2013) found that writers who are sure purposefully use *will* to express their certainty. Not speaking forcefully and with certainty about the implications of a study (when justified) could lead to skepticism on the part of the reader, when such an interpretation may be unwarranted.

Limitations

Insights from the results of this exploratory study can only be related to papers published in the JFCS, 2011-2015. Results are not generalizable to the larger population of home economists, and definitive conclusions are not possible. But, insights that emerged from this analysis can help formulate a more precise problem for future research. In particular, future studies should measure modal flavour. It provides context for the attitudes expressed using modal verbs (see Table 3). One recommended approach is to interview authors to discern what modal flavour underpinned their articulated beliefs and attitudes for a particular piece of research? Why home economists are asserting particular ideas is an important issue (see Hacquard, 2011; Hinkel, 2009). More volumes of JFCS should be coded as well as other venues of home economics discourse (e.g., other journals, conference proceedings, books, and chapters to create a more complete corpus). Finally, future studies might consider coding abstracts to provide additional insights into modal force, thereby adding more data dispersion to augment averages (Viel, 2002).

Conclusion

Modality in home economics is a new stream of research. Modality (a linguistic term for mood) is a means by which speakers linguistically express their attitude toward the idea being proposed (Dury, ca. 2000; Huddleston & Pullum, 2005); that is, are they certain, are they thinking about the possibilities, or are they taking a moral stand? The results of this exploratory study corresponded closely with comparative studies. Overall, the majority of authors in this data set used the possibility modal force (47%), followed by the obligation modal force (35%), with certainty the least common (18%), with this pattern holding for each type of paper (scholarship, practice, and strategy). Thompson (2001) found the exact same pattern.

The results warrant recommending that home economists acknowledge the import of choosing modal verbs when proposing future actions based on their study. Thompson (2000) believed that, generally speaking, academic writers do not pay enough attention to this aspect of communicating their scholarship. Home economists must be cognizant of whether they are articulating a certainty, a possibility, or an obligation. With this modal awareness, they are more likely (this is a moderately forceful claim) to choose the best modal verb to communicate their attitude about the import of their research, instead of leaving this to agent-controlled interpretation. And, as a caveat, the “level of modality used to express your opinion [about the import of your study] **must match** the level of certainty provided by your evidence” (UniLearning, 2000, emphasis in original).

Framing the recommendation, conclusion, and implication sections of a research report as an expression of the author’s *mood* is an interesting avenue for future research in home economics. Who knew the power of *can*, *should*, *could*, *might*, and *may*? All home economists strive to be a force that shapes family and individual well-being and quality of life; hence, the force of their words matters. Conscious and intentional choice of modal verbs, to reflect a critically examined research and practice mood (attitude), *will* better serve the profession, and hold us more accountable to each other, and to society. Home economists cannot leave this aspect of professional communication to chance. Purposefully selecting modal verbs

when reporting research implications better ensures manifestation of power and influence in their practice, thereby contributing to the profession's legitimate impact in society.

Biography

Dr Sue L. T. McGregor (Professor Emerita) is a Canadian home economist (over 45 years) recently retired from Mount Saint Vincent University (Canada). She was one of the lead architects for the interuniversity doctoral program in educational studies, serving as its inaugural Coordinator. She has a keen interest in home economics philosophy, transdisciplinarity, and consumer studies. She is IFHE-certified as an International Professional Home Economist, a TheAtlas Fellow (transdisciplinarity), a Docent in Home Economics at the University of Helsinki, the Marjorie M. Brown Distinguished Professor (home economics leadership, KON), the Karpatkin International Consumer Fellow, and she received the TOPACE International Award (Berlin) for distinguished international consumer scholar. Affiliated with 16 professional journals (editor, co-editor, associate editor, board member), she has nearly 170 peer-reviewed publications, 60 book chapters, 10 monographs, and 4 books, with one in progress. She has delivered 32 keynotes and invited talks in 15 countries. Dr McGregor is a Principal Consultant for The McGregor Consulting Group (1991) <http://www.consultmcgregor.com>, sue.mcgregor@msvu.ca

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Class Practice in Primary School about Kasanegi (Wearing Clothing in Layers) for ESD

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Abstract

ESD involves the incorporation of key sustainable development issues into learning and requires learning methods that empower and motivate learners to take action for sustainable development. In Japanese Kateika (Home economics education), a large number of classroom practices have developed for ESD. One example of such practice is the unit titled “Comfortable Clothing and Housing,” which is part of the primary school Kateika curriculum. In order to stay warm and comfortable in cold winter, we usually wear clothing in layers, which, in Japanese, is called kasanegi. This creates immobile layers of air between the body and clothing and between layers of clothing that increase heat insulation. To practice a sustainable lifestyle and to conserve energy, it is important to have knowledge and skills related to comfortable and appropriate clothing. The objectives of this research were as follows: 1) to develop an ESD lesson for teaching about clothing layering in the primary school Kateika curriculum and 2) to assess the effectiveness of the unit.

The lesson was to focus on the ways that daily clothes can be worn comfortable manner based on scientific information related to the function of clothes. The content was expanded include ESD with a scientific approach and recognizing cultural diversity. Scientific knowledge was addressed in order to think critically about the relationship between human life and environmental issues. The lesson was conducted and evaluated in the 6th grade of primary school based on a questionnaire containing various statement to which the students could indicate their degree of agreement (or disagreement) before and after the lesson on a five point scale.

Evaluation of lessons effectiveness revealed that, after the lesson, students agreed to a greater degree to the following statements: “I know what ‘sustainability’ is;” “I understand why layered clothing keeps people warm;” “I can figure out a way to stay warm in winter while conserving energy;” and “It is effective to figure out a way to make better clothing and living for a sustainable future”. The ESD lesson based on scientific information related to clothing was effective in empowering the students to learn about sustainability and to improve their lifestyle for sustainable future.

Introduction

Current ESD

The goal of Education for Sustainable Development (ESD) is to enable every human being to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future (UNESCO, 2015). In an effort to reorient teacher education to address sustainability at York University (Toronto Canada), in 2013, the UNESCO Chair invited researchers from primarily high-scoring PISA countries clarify the contributions of ESD to quality education. The research suggested that ESD will have substantial impact on academic outcomes, including PISA scores, but that more research is needed to identify best and efficient practices (Hopkins, 2014).

At the Johannesburg World Summit on Sustainable Development (WSSD), the period from 2005 to 2014 was declared to be the “Decade of ESD (DESD)” (UNESCO, 2006). ESD-related topics, initiative, and projects are increasingly being incorporated into primary and secondary education curricula (UNESCO, 2014a).

In Japan, ESD is defined as “education that enables individuals (UNESCO, 2015) to recognize that they exist in relation to people around the world, future generations, and their environment and to change their behaviour accordingly” (MEXT, 2013). The number of UNESCO schools in Japan has increased from 20 in 2008 to 913 in 2015 (ACCU, 2015).

Iwamoto (2014) argues that the competency fostered by ESD is related to ‘Key Competencies,’ which the OECD advocated as being abilities that are essential for personal and social development of individuals in modern, complex societies.

During the UN Decade of ESD, UNESCO and the Government of Japan have created a range of international initiatives to promote ESD globally. The UNESCO World Conference on ESD held in Aichi-Nagoya, Japan in 2014 adopted the declaration and called for urgent action to further strengthen and up-scale ESD efforts in order to enable both current and future generations to meet their needs by taking a balanced and integrated approach to economic, social and environmental dimensions of sustainable development (UNESCO, 2014b). The Global Action Programme (GAP) on ESD was endorsed by the 37th session of the UNESCO General Conference as a follow up to the DESD that continues to build on the momentum of stakeholders who are jointly seeking change, innovation and transition towards a shared vision of sustainability (UNESCO, 2013). The overall goal of the GAP is to develop and up-scale action at all levels and in all areas of education and learning to accelerate progress towards sustainable development. According to the GAP, ESD relates to the environmental, social and economic pillars of sustainable development in an integrated, balanced and holistic manner and respects cultural diversity.

Kateika (Japanese Home Economics Education) as ESD

Ito et al. (2012), Ito and Nakayama (2015) and Zaitzu (2013) indicated that *Kateika* is the subject very close to ESD in terms of its contents. Nakayama and Ito (2012) argued that *Kateika* is closely related to ESD in terms of content. *Kateika* may be more pertinent to ESD than the other subject areas (Ito and Nakayama 2014). In addition, Ito and Nakayama (2014)

demonstrated that an interdisciplinary approach based on collaboration between *Kateika* and other disciplines was useful and beneficial to achieving the goals of ESD.

It has been pointed out in other countries as well that, as a discipline, home economics shares certain objectives and content with ESD. Dewhurst and Pendergast (2011) reported that home economics teachers in four countries, including Scotland and Australia, see the potential for home economics to contribute to ESD.

Japan's current curriculum guidelines stipulate that ESD should be promoted in *Kateika* as well as in other subject areas including social studies, science, technology, moral education, and integrated studies. Table 1 shows how the *Kateika* curriculum (MEXT, 2008/2009) is related to ESD. The sustainability-related content of the *Kateika* curriculum was enriched in the 2008/2009 revision of the curriculum guidelines. Primary school and secondary school *Kateika* curricula cover four areas of study:

- a. family and related topics;
- b. food and cooking;
- c. clothing and housing; and
- d. consumption and the environment.

The upper secondary school *Kateika* curriculum covers three areas of study:

1. human life, family and welfare;
2. independent living, consumerism and the environment; and
3. home projects.

Area 1 human life, family and welfare comprises four subcategories:

- a. independence, family and home in adolescence;
- b. child development and childcare;
- c. life in older age;
- d. convivial society and welfare.

Area 2 independent life, consumerism and the environment comprises five subcategories:

- a. diet and health;
- b. clothing management and clothes selection;
- c. housing and living environment;
- d. daily consumption and lifespan financial planning; and
- e. lifestyle and the environment.

Table 1 *Kateika* curricula content related to ESD

Primary school (5-6th grade)	(PA) Family and Family Life (PB) Daily Meals and Basic Cooking (PC) Comfortable Clothing and Housing (PD) Daily Consumption and the Environment
Secondary school (7-9th grade)	(SA) Family, Home, and Child Growth (SB) Food, Cooking, and Independent Life (SC) Clothing, Housing, and Independent Life (SD) Daily Consumption and the Environment

Table 1 cont. *Kateika* curricula content related to ESD

Upper secondary school [Basic Home Economics] (10-12th grade)	(U1-A) Independence, Family, and Home in Adolescence (U1-B) Child Development and Childcare (U1-C) Life in Older Age (U1-D) Convivial Society and Welfare (U2-A) Diet and Health (U2-B) Clothing Management and Clothes Selection (U2-C) Housing and Living Environment (U2-D) Daily Consumption and Lifespan Financial Planning (U2-E) Lifestyle and the Environment
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Scientific approach and Cultural Diversity of ESD

Scientific approach of ESD

ESD tackles issues that have been identified primarily (if not exclusively) in the context of environment/ nature-oriented issues (climate change, biodiversity, water...) and, thus, to circumstances and phenomena that are purview of scientific inquiry. Accordingly, ESD benefits from and relies on scientific understanding.

Cultural Diversity of ESD

With the exception of Antarctica, human beings have inhabited every corner of the world for centuries. As groups of people worked and lived together, they developed distinctive cultures. Taken together the cultures of the world create a rich and varied tapestry. The resulting cultural diversity expands choices, nurtures a range of skills, values, and worldviews and provides wisdom from the past to inform the future. Cultural diversity is a wellspring for sustainable development for individuals, communities, and countries. Thus, to create an effective global approach to sustainable development and ESD, we need to respect, protect, and maintain the cultural diversity of the world, now and in the future.

Cultural diversity exerts a strong influence on ESD in so far as ESD must be locally relevant and culturally appropriate. Culture influences what the current generation chooses to teach successive generations in terms of the knowledge that is valued, skills, ethics, languages and worldviews. If people are to live together peacefully, ESD requires intercultural understanding whereby differences among cultural and ethnic groups are tolerated and accepted.

As shown in table 2, the *Kateika* curricula for grades 5 through 12 share certain objectives with ESD in terms of a scientific approach and celebration of cultural diversity. The objectives and contents of various *Kateika* areas including food and cooking, clothing and housing, and lifestyle employ a certain scientific approaches. Similarly, Table 2 identifies family and other study areas that are related to cultural diversity.

Table 2 Scientific approach and cultural diversity of ESD in *Kateika* curricula

	Scientific approach	Cultural diversity
Primary school (grades 5 to 6)	<ul style="list-style-type: none"> To know the nutrients that are essential to our bodies and their functions (PB) To have an interest in and be able to think of ways to wear their everyday clothes in a comfortable manner with knowledge of the function of clothes (PC) To understand the importance of living in accordance with the seasonal cycle, and to be able to devise ways to maintain a comfortable home (PC) 	<ul style="list-style-type: none"> To reflect upon and improve their family life in light of better relationships with the people in their neighborhood (PA) To be able to cook rice and miso (soybean paste) soup (PB)
Secondary school (grades 7 to 9)	<ul style="list-style-type: none"> To understand the types of nutrients and their functions, and to think about characteristics of the nourishment required in early adolescence (SB) To understand how to arrange an indoor environment that considers family safety and to be able to devise comfortable modes of living (SC) 	<ul style="list-style-type: none"> To take an interest in one's own family relationships from here onward and to think about ways to improve better family relations (PA) To take an interest in eating habits, and be able to devise, plan, and put these into practice for one's daily meals or activities like cooking using regional ingredients. (PB)
Upper secondary school [Basic Home Economics] (grades 10 to 12)	<ul style="list-style-type: none"> To acquire basic fundamental knowledge and skills relating to clothing materials and construction of clothes in order to maintain their clothes, to select clothes depending on the purpose, and to practice a healthy and comfortable clothing management (U2-B) To acquire fundamental knowledge and skills related to functions of housing, the relationship between houses and a community, and to practice safe housing management with consideration of the environment (U2-C) To understand the relation between human life and the environment, and to proactively practice a sustainable lifestyle (U2-E) 	<ul style="list-style-type: none"> To make decisions and act responsibly in order to create comfortable family and community life (U1-A) To recognize the roles of parents, families, communities and society with respect to child development (U1-B) To recognize the roles of a families, communities, and society for supporting independent life of elderly people (U1-C) To recognize the importance of living together and supporting each other as a members of families, communities, and society (U1-D)

Purpose of this study

The research objectives of this study were:

1. to develop an ESD lesson on wearing clothing in layers in the *Kateika* curriculum for primary school students and
2. to assess the effectiveness of this lesson.

In the development of an ESD lesson on wearing clothing in layers geared toward primary school *Kateika* students, we focused on the scientific approach and cultural diversity. Figure 1 shows the framework and concept of the lesson.

The lesson was primarily related to human life style and was focused on ways to wear daily clothes comfortably based on scientific information of the function of clothes. In Japan, seasonal changes (from cold winters to hot summers) are more dramatic than in certain other

countries. The goal was to enable students to think about and develop skills related to wearing clothes comfortably and matching clothing to the regional climate. Energy consumption in homes and offices account proximately one third of all energy consumption in Japan (METI, 2014). Thus, it is an area in which life style development for sustainability is urgently required.

The aim of the lesson was to adopt both a holistic approach and scientific approach and to recognize cultural diversity while encouraging students to change their life style for sustainability. We assessed the effectiveness of this lesson based on the degree to which students devise ways to make better clothing and living for making sustainable future.

We utilized scientific information to encourage critical thinking regarding the relationship between human life and environmental issues. Focusing on cultural diversity, the students were shown many types of the daily clothes from around the world. The students heard comments from an exchange student from Indonesia, who discussed difficulties related to wearing clothes in winter in Japan. The students were asked to make an advice sheet for the student on how to wear clothes comfortably during Japanese winters.

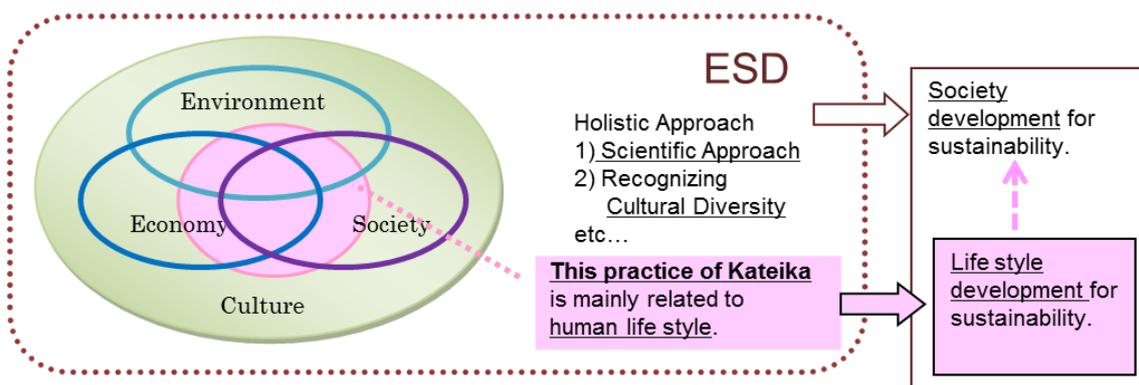


Figure 1 Framework and concept of the lesson

Methods

The lesson and evaluation consisted of two classes conducted in a 6th-grade (primary school) class in Chiba prefecture, Japan (Feb. 3, 2015, 10:50 to 11:50 am and Feb. 5, 2015, 8:40 to 9:20 am). The students (n=39) had already had a basic lesson on “comfortable clothing and housing”. In this lesson, however, the content was expanded include ESD with a scientific approach and recognizing cultural diversity.

The lesson plan is shown in Table 3. As an introduction for the first class, the teacher began by asking students to give advice to children visiting Japan from a hot climate who are having trouble with the cold Japanese winter on how to wear clothes. The students were shown annual climographs and typical clothes for a tropical rainforest climate and desert climate . which they then compared to Japan. The students recognized differences in life style in the different climate regions. In Japan, in order to stay warm and comfortable in the cold winter season, Japanese people wear clothing in layers, a practice that is called kasanegi. This creates immobile layers of air between the body and clothing and between layers of clothing,

which increases heat insulation. After that, the students provided some ideas about what to wear to stay warm in winter based on their own life style. Next, the teacher provided scientific information on how to wear clothes comfortably in winter, touching on topics such as the human thermoregulation system, heat conductivity of air, vertical updraft plumes around the human body, and the effects of *kasaneji*. With regard to the effects of *kasaneji*, the students were shown an educational video in which the temperature of the clothes microenvironment is measured. The students discussed the video and took notes on how to dress warmly in winter. In the second class, students brainstormed on advice on how to dress warmly and then framed a response using the KJ-method. In the last part of the class, the students completed advice sheets.

The effectiveness of the lesson in terms of ESD was assessed. Students indicated their degree of agreement to various statements based on a five point scale before the 1st lesson and after the 2nd lesson. Students were also asked to provide written feedback as part of a questionnaire.

A paired t-test was used to compare whether the students' evaluations changed before and after the lesson (SPSS statistics Ver.21). In the case of missing data, only cases with valid data for the variable pair being tested were used.

Table 3 Outline of the lesson plan

	Class content	Educational tools/ Activities	Scientific approach	Cultural diversity	
The 1st Class	Introduction	The teacher asked students for advice geared toward children from a tropical rainforest climate on how to dress for winter in Japan.	Students were shown climographs and typical clothes in tropical rainforest and desert climates.	✓✓	✓✓
	Main Part	Students worked in groups to come up with ideas on how to dress warmly in winter.	Students thought about their own life styles and exchanged opinions in groups.		(✓)
		Teacher provided scientific information about wearing clothes comfortably in winter.	Lecture on the human thermoregulation system, heat conductivity of air, vertical updraft plume around the human body, and effects of <i>kasaneji</i> . The students were shown an educational video containing scientific information.	✓✓	
	Conclusion	The students discussed how to dress warmly in winter.	Students took notes on sticky notes.	✓	✓
The 2nd Class	Introduction	Quick review of the 1st class.			
	Main Part	Students brainstormed advice on how to dress warmly. Students completed advice sheets. Students exchanged opinions on their advice sheets.	Students took notes on sticky notes and framed a response using the KJ-method. Short presentations on advice sheets.	✓	✓
	Conclusion	The group work was summarized and the effectiveness of the lesson as assessed.	ESD evaluation sheet.	✓	✓

Results

The results of the ESD evaluation sheet are shown in Figure 2. With regard to evaluation of lesson effectiveness, after the lesson, students agreed to a significantly higher degree with the following statement:

“I usually devise ways to live with sustainability in mind” ($p < 0.01$);

“I know what ‘sustainability’ is” ($p < 0.001$);

“I know how layered clothing keeps people warm” ($p < 0.01$);

“I can devise a way to stay warm in winter that conserves energy” ($p < 0.001$);

“It is useful to express my own opinion and hear others’ opinions on how to live better” ($p < 0.05$); and

“It is useful to devise ways to make better clothing and to create a sustainable future” ($p < 0.001$).

No significant change in students’ agreement were observed before and after the lesson for the statements “I usually devise ways to be economical with resources, such as water, energy and so on”, “it is important to receive differing opinions”, “it is important for me to help others”, and “I know that doing one’s best for others makes a good community”. Students tended to agree with these statements both before and after the lesson.

The students’ feedback on the lesson is shown in Table 4. The students’ comments were broadly divided into three types. The first type of comment was related to understanding mechanisms based on a scientific approach and promoting the creation of better lifestyles. The second type of comment had to do with how we can link our lifestyles to a sustainable future. The third type of comment was related to recognizing cultural diversity and being interested in communicating with others.

Discussion

The objective of this research was to develop and evaluate the effectiveness of an ESD lesson on wearing clothing in layers for the primary school *Kateika* curriculum and examine its educational effectiveness. The lesson plan focused on applying the scientific approach and recognizing cultural diversity.

The results of the ESD evaluation sheets indicated that students gained a great understanding of how layered clothing keeps people warm from a mechanistic standpoint. They also thought about and identified practical ways to stay warm in the winter while conserving energy. In addition, they learned about the relations between the Japanese clothing know-how in winter and the sustainable lifestyle for conserving energy including electricity etc. The results of the ESD evaluation sheets also indicated that the lesson would be useful for getting students to express their own opinions and to hear the opinions of others for creating better lifestyles. It revealed that the learning of cultural diversity through this practice should enhance their acceptance of different ideas and thoughts from them as well as their respect mind of their own lifestyle and others’.

The lesson may potentially be beneficial in terms of getting students to perceive how their lives are related to sustainability, as evidenced by the students’ increased agreement after the lesson with the statements “It is useful to devise ways to make better clothing and to create a sustainable future” and “I usually devise ways to live with sustainability in mind.”

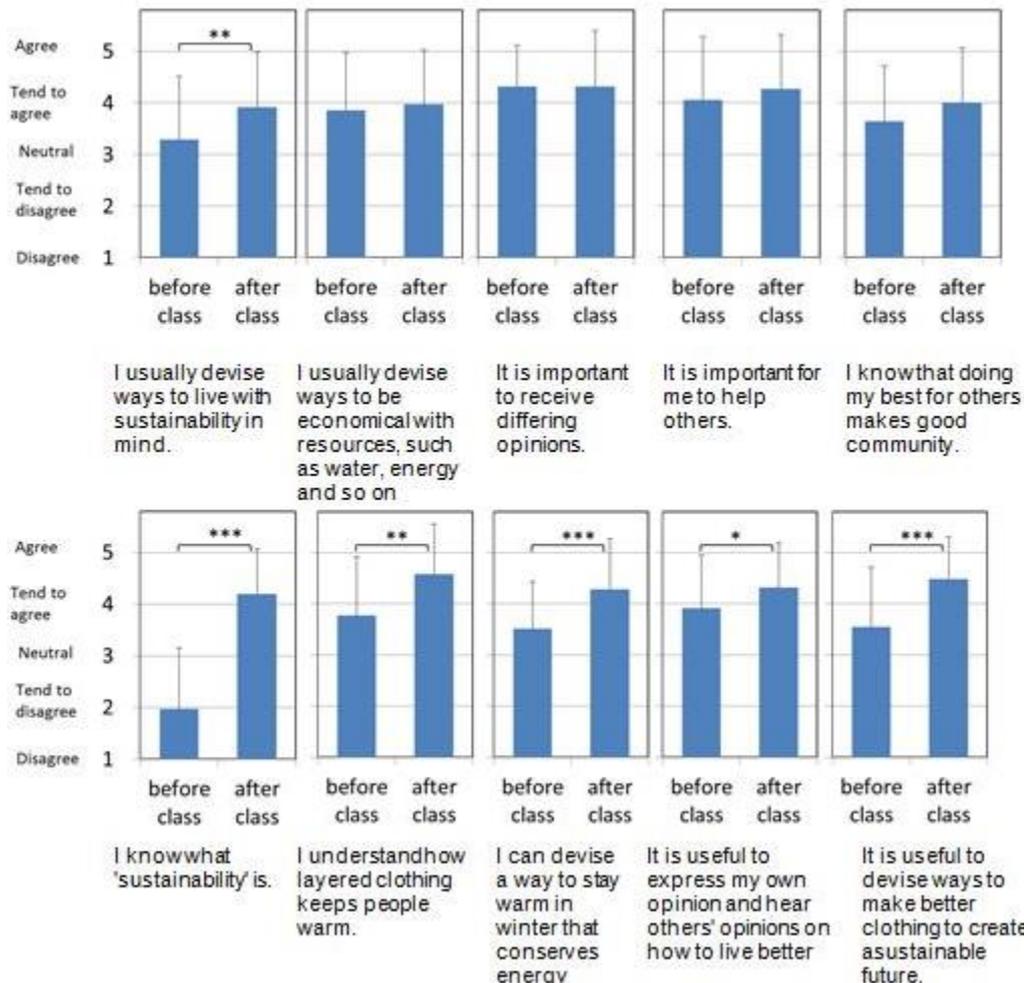


Figure 2 Results of ESD evaluation sheets (**p<0.01, ***p<0.001, *p<0.05)

Table 4 Three types of students’ feedback on this lesson.

<p>1. Understanding mechanisms based on scientific approach and promoting the creation of better lifestyles.</p> <ul style="list-style-type: none"> I understand why <i>kasanegi</i> is effective on wearing warm in winter. I was interested in the mechanisms of how to dress warmly in a cold climate. I want to apply this knowledge in practical life, etc.
<p>2. Linkin our lifestyles to a sustainable future</p> <ul style="list-style-type: none"> I now understand what “sustainability” is. I understand that our lifestyle is related to sustainable society and the future. I want to devise ways to create better lifestyles for a sustainable future, etc.
<p>3. Recognizing cultural diversity and interest in communicating others.</p> <ul style="list-style-type: none"> I never knew that our way of dressing, <i>kasanegi</i>, represents traditional clothing culture matched to Japan’s climate . I want to share our knowledge to others, etc.

Another notable result revealed by the students' feedback on the lesson is that the students gained a deep their understanding of the scientific mechanisms related to sustainable clothing lifestyles such as *kasanegi*. One student wrote as "I was interested in the mechanisms of how to dress warmly in a cold climate. I want to apply this knowledge in practical life." It seems the lesson helped students realize that their lifestyles are connected with sustainable society and the future. Learning about *kasanegi* encouraged the students not only to practice a sustainable clothing lifestyle but also to create better lifestyles for a sustainable future. In addition, students' recognition and appreciation for cultural diversity improved after the lesson. Some students reported that they became interested in communicating with others. Based on the students' reflections on how their feelings and thoughts changed after the lessons, we conclude that the students, overall, felt that their holistic thinking had improved.

ESD requires each student to change his or her own lifestyle. This pilot study, in which the scientific approach, cultural diversity, and holistic thinking were incorporated into the *Kateika* curriculum enhanced the students' awareness of the connection between their lives and sustainability. The effectiveness of the pilot ESD lesson was clarified through the analysis of this research as a whole.

Implications for ESD

The findings of this study indicate that *Kateika*, as a discipline, can potentially develop and implement ESD lessons, because it shares certain objectives and content with ESD. Such lessons can enable students to connect their daily lives with sustainability and provide the students with practical skills that they use to change their lifestyles.

The study also demonstrated that the ESD lesson in which a scientific approach, appreciation for cultural diversity, and encouragement of holistic thinking were incorporated into *Kateika* was effective as ESD. It serves as a good case study for educators and teachers in various disciplines to develop their own curricula in terms of ESD.

Another important contribution of this research is the proposal of a method for measuring lesson effectiveness. It would be beneficial for ESD researchers to assess the educational effectiveness of specific ESD programs through practical study.

Study Limitations

Due to the small number of classes and participants, the scope of inference of this study is severely limited. To generalize the results, further research based on a broader sample of classes conducted at different schools will be required.

Although each statement on the ESD evaluation sheets was created based on previous ESD studies, more in-depth discussion among researchers from various ESD-related fields is warranted.

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Biography

Naoe Nishihara is a lecturer at the Faculty of the Liberal Arts, University of the Sacred Heart, Tokyo in Japan. She received her PhD from Ochanomizu University in 2004. She has published articles on thermal environment and energy conservation. Her current research interests include home economics education and sustainable lifestyles, especially in the area of clothing and indoor environment.

Yoko Ito is a professor at the Faculty of Education, Chiba University in Japan. She has taught as a Visiting Professorial Fellow at the Institute of Education, University of London in 2013. She received her doctorate in educational psychology from Ochanomizu University in 2003. She has served as the President of the Japan Association of Home Economics Education since 2015. She has published numerous articles and book chapters on Kateika (Japanese Home Economics Education)' and child development education. Her current research interests include cross- cultural studies of ESD (Education for Sustainable Development).

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Challenges facing teaching and learning of clothing and textiles in Abia State secondary schools, Nigeria.

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Abstract

The study identified the challenges of teaching and learning clothing and textiles as a subject in secondary school in Abia State, Nigeria. Three (3) research questions guided the study. Survey research design was adopted for the study. The population for the study comprised 290 students and 8 Home Economics teachers, a total population of 298 subjects. Sample sizes of 298 subjects were purposively selected for the study. A structured questionnaire of a 4 point rating scale was the instrument used for data collection. The data collected were statistically analyzed using frequency, percentages and mean. The result among others showed that some challenges encountered by the teachers include lack of instructional materials, no incentives to clothing and textile teachers, ill equipped clothing and textile laboratories in schools and some students' lack of interest in the subject. The challenges encountered by the students identified by the study among others include, time consuming and financial involvement nature of the subject, incompetences of some clothing and textile teachers. Some identified strategies for remedying the situations among others include, encouraging the clothing and textile teachers and students by equipping the clothing and textile laboratories, sponsoring/ provision of materials for practical teaching by school authorities, encouraging the teachers by sending them to in-service training both locally/internationally and awarding prizes to performing students in the subject. The above efforts if put in action will enhance the teaching and learning of the subject in the state.

Keywords: Challenges, Teaching and Learning, Clothing and Textiles, Secondary Education

Introduction

Clothing is one of the basic necessities of a man. The wearing of clothes is a feature of nearly all human societies. The amount and type of clothing worn is dependent on physical stature, gender, as well as social and geographical consideration. According to Ukpore (2006), clothing is one of the basic needs of man which influences an individual's health, wellness and status. Clothing serves many purposes like protection from weather adverse conditions, and can enhance safety during hazardous activities such as hiking and cooking. It protects the wearer from rough surfaces, rash-causing plants, insect's bites, splinters, thorns and pickles, by providing a barrier between the skin and the environment. Clothing is used to show people's status and the roles they play in the society (Anyakaoha and Eluwa, 2008). It is also used to protect, beautify and adorn the body.

Textile is a type of material composed of natural, man-made or synthetic fibres. It includes animal based materials such as wool, silk, hair and plant based materials such as cotton,

linen, ramie, sisal and synthetic material such as polyester and rayon. Anyakoha and Eluwa (2002) describe textiles as fabric or clothes used for making clothes and other household articles such as bed sheets, cushion covers, curtains, blinds etc.

Clothing and textiles is one of the major branches of Home Economics, it is one of the elective subjects which students are expected to offer at the Senior Secondary school level of education. Arubayi (2003) explained that the aim of clothing and textile is to help learners acquire knowledge, skills and techniques for meeting personal and societal clothing needs. The aim of clothing and textiles curriculum at the Secondary Schools is to teach the learners how to strategically plan and use available resources in the environment to improve the home, family and societal clothing needs (Mberengwa, 2004).

Clothing and textiles in school curriculum also provides students with entrepreneurship skills in clothing and textiles, which if purposefully harnessed will equip them with skills in productions of income yielding articles e.g. crafts, beadwork, fashion designing, board work etc. Mberengwa (2004) stated that through the subject clothing and textiles, students could be trained in home making, employment in textile mills or clothing factories. It has to be noted that apart from the fact that Clothing and textiles skills are needed for the job market, students are supposed to learn practical skills which could be useful to them in higher institution or enable them get jobs in industries or other sectors of the nations.

In another term, Waudo (2000) ascertained that with the increasing freedom and labour within the committee of nations in the world, there is the tendency that the rate of acculturation will be enhanced with the study of clothing and textiles. For instance, the massive increase in tourism has led many foreigners to have interest in buying traditional Nigerian textiles and wears (Ukpore, 2006). This is an advantage of the gross domestic earnings of the Nigerian nation.

Given these justifications for the study of clothing and textiles, one begins to appreciate the feasibility and value in teaching and learning of clothing and textiles in schools. The effectiveness of the clothing and textiles as a means for global survival would be compromised if the problems that plague the study of the subject in Nigeria secondary schools are not unveiled and tackled.

Secondary education, according to national policy Education (2004) is the form of education children receive after primary education and before the tertiary stage. Secondary education lasts for six years. It is broken into two stages, three years junior secondary school and three years senior secondary school (National Policy on Education, 2004).

The broad aim of secondary education within the overall national objectives is preparation for useful living within the society as well as preparation for higher education. In specific terms, the objectives among others are:

- a. To provide an increasing number of secondary school students the opportunity for education of higher quality, irrespective of sex or social, religious and ethnic background.

- b. To diversity its curriculum to carter for the difference in talents, opportunities and roles possessed by or open to students after secondary schools course.
- c. To equip students to line effectively in our modern age of science and technology.
- d. To aspire the students towards higher achievements and self improvement both at school and at a later life. Some of the subjects taught in secondary schools includes: English language, Mathematic, Biology, Chemistry, Physics, Health Education, Geography, Religious studies, computer science, Agricultural science, and Home Economics.

Home Economics is a filed of study that is primarily concerned with equipping the students with knowledge necessary to make them self reliant through the acquisition of the basic skills and knowledge embedded in the Home. Home management, Food and Nutrition as well as Clothing and Textiles are major branches of Home Economics (Eze, 2001).

Clothing and textiles as a component of Home Economics deals with the study of the origin of fibres, uses, selection, garment construction, care and maintenance (Ezema, 2001). Clothing and textiles provides skills in clothing jobs like sewing, dyeing and several others.

The subject Home Economics seem to experience low students enrolment especially in clothing and textiles because some people view or look at it as a subject for girls only excluding boys. Another reason is that some give reasons for the low enrolment due to lack of teachers in the area, poorly equipped laboratories, time table/period allocated for teaching the subject not adequate, students not having interest, complained it is time consuming and many other numerous complaints.

Statement of the problem

It has been observed that the status of clothing and textiles as a subject in secondary schools is devastating. During the preliminary study the responses of some of the secondary school principals interviewed by the researcher showed that presently, secondary school student's interest and enrolment in clothing and textiles as a subject is very low. The attitude associated with Home Economics as a subject for only girls/women and which also involve cooking and sewing only appears to affect student's enrolment in clothing and textiles as a subject. Evidence of which is shown vividly on Table 1 below.

Table 1 Number of students enrolment in the 3 areas of Home Economics in West African senior secondary school certificate examination in May/June O' Level between 2012-2015

Year	Home Management	Food & Nutrition	Clothing & Textile
2012/2013	250	38	15
2013/14	75	43	12
2014/2015	154	56	8

Source: Abia State Secondary School Educational Management Board, Statistics Unit, 2015

The above table shows the number of students offering clothing and textile between the periods of 2012-2015. A closer observation of the table will discover that the numbers of clothing and textiles students that enroll in West Africa Senior School Certificate Examination have been on a steady decrease from 2012-2015. Despite the fact that clothing and textiles programs equip the students with job skills, the student's enrolment are very low.

It is on this premise that this study is set out to examine the status of clothing and textiles in secondary schools in Abia State, identify the challenges of teaching and learning clothing and textiles in the state that resulted to low students enrolment, and then suggest possible ways of improving the student's enrolment in the subject.

Objectives of the study

The main purpose of this study is to identify the challenges of teaching and learning of clothing and textile in secondary school in Abia State, Nigeria. Specifically, this study sought to:

1. Identify the challenges teachers are facing in teaching clothing and textiles in secondary schools.
2. Identify the challenges the students are facing in learning clothing and textiles in secondary schools.
3. Identify strategies for handling the identified challenges of teaching and learning clothing and textiles.

Research questions

The following questions guided the study:

1. What are the challenges teachers are facing in teaching clothing and textiles in secondary schools?
2. What are the problems students are facing in learning clothing and textiles in secondary schools?
3. What are the strategies for enhancing teaching and learning of clothing and textiles in secondary school?

Methodology

The study adopted survey research design while the area of study was Abia State, Nigeria. The population for the study comprised two (2) main groups of respondents namely all the clothing and textile teachers in Abia State secondary schools and all the students offering clothing and textile as a subject. During the preliminary study, the available records at Abia State Secondary School Management Board (SEMB), Statistics unit, Umuahia revealed that there were 241 secondary schools in Abia State secondary school system. Out of the 241 schools, only four (4) schools offer clothing and textile as a subject. In the 4 schools, there were 8 clothing and textile teachers while there were 726 students in the 4 schools

respectively. The breakdown of the number of the students and the teacher in the 4 schools are as follows in Table 2.

Table 2 Population of Schools, Students and Teachers offering clothing and textile subject in Abia state secondary schools 2014/2015 session.

S/n	Schools	Number of students	Number of teachers
1.	Girls Secondary School.	300	2
2.	Ibeku High School.	126	1
3.	Federal govt. Girls' College	200	3
4.	Girls' High School.	100	2
	Total	726	8

Source: Abia State Secondary School Educational Management Board, Statistics Unit, 2015

Sample and sampling techniques

A critical look at the above population distribution of the number of students offering clothing and textiles in the 4 schools, one will discover that the population is not evenly distributed. Therefore, the researcher decided to use 40% of the population of the students in each school for the study. For example, 40% of 300 students in Girls' secondary = 120, 40% of 126 in Ibeku High school = 50, 40% of 200 in Federal Govt. Girls' college = 80, and 40% of 100 in girls' High School = 40. These made up a total sample size of 290 students selected for the study. For the Home Economics teachers, all the teachers, were involved in the study because they are few and manageable. This made a total sample size of 298 subjects involved in the study.

Instrument for data collection

A structured questionnaire was used for the data collection. The instrument was in four (4) sections: A, B, C and D respectively. Section A elicited information on the demographic data of the respondents. Section B identified the challenges facing clothing and textile teachers. Section C identified challenges facing clothing and textile students while Section D elicited information on the strategies for enhancing teaching and learning clothing and textiles. A four point rating scale was used for rating responses, Strongly agreed (SA), Agree (A), Disagree (D), and strongly disagree (SA) with values 4, 3, 2, and 1 assigned respectively.

Validation of the instrument

The instrument was validated by three (3) experts (two lecturers from Home Economics department and one lecturer from Measurement and Evaluation Department, both in Michael Okpara University of Agriculture, Umudike. The contributions of the validates reflected in the final draft of the instrument before it was administered.

Data collection and analysis techniques

298 copies of the questionnaires were distributed to the respondents by the researcher and two research assistants by hands. 290 copies of the questionnaires representing 97% were correctly filled and returned while 8copies representing 3% were not returned. The statistical tools used for data analysis were frequency, simple percentages (%) and mean. Frequency was used to organize the data collected, Percentage was used to analysis the demographic data of the respondents while mean was used to analyze the responses to research questions. The mean was calculated by assigning nominal values to the response categories. Based on a four-point rating scale of 4, 3, 2 and 1 respectively, a mean rating of 2.50 was regarded as a minimum acceptable mean response while any mean below the acceptable mean of 2.50 was rejected.

Findings

The presentation of the data is organized in accordance with the research questions and is presented in tables below.

Research Question 1

What are the challenges/problems facing clothing and textile Teachers in secondary, schools?

Table 3 shows that all the challenges are facing clothing and textile teachers in secondary schools. This is shown by their mean scores which were all up to and some were even above the acceptable mean score of 2.50.

Table 3 Mean responses of the teachers on the challenges facing clothing and textile teachers.

S/N	Teachers challenges/problems	Mean X	Remark
The following are the challenges/problems Facing clothing and textile teachers.			
1.	Inadequate number of clothing teachers in the schools.	2.96	Agreed
2.	Lack of teaching equipment.	2.86	Agreed
3.	None provision of practical materials by school authorities.	2.57	Agreed
4.	Poor perception of parents/students and Students lack of interest in Clothing and Textile subject.	2.97	Agreed
5.	Inability of the parents to provide their child's/wards with materials needed for the practical lessons and inability of teachers to improvises.	2.99	Agreed
6.	Lack of practical and simplified textbooks on clothing and textiles.	2.89	Agreed
7.	Insufficient time for practical lessons and Students irregularities in attending clothing and textile practical lessons.	2.82	Agreed

Research Question 2

What are the challenges the students are facing in learning clothing and textile as a subject?

The result in Table 4 show that the students are faced by all the challenges enumerated above in learning clothing and textiles in secondary schools in Abia State. The is shown vividly in the mean responses of the students which were all up to the minimum acceptable mean score of 2.50 and some were even above the mean cut off.

Table 4 Mean responses of the students on the challenges facing learning of clothing and textiles.

S/N	Students challenges/problems	Mean X	Remark
	Students encounter the following challenges/problems in learning clothing and textiles as a subject.		
8.	No interest and confident in the subject.	2.62	Agreed
9.	Feel bored during clothing and textile Lessons.	2.82	Agreed
10.	Too much money is spent buying materials for clothing and textiles practical lessons.	2.98	Agreed
11.	People look at Clothing and textile as a career/ job for the illiterates/low achievers.	2.76	Agreed
12.	Some teachers use difficult methods in teaching practical lessons eg clothing construction.	3.00	Agreed
14	Clothing and textiles practical consume most time for reading other subjects.	2.72	Agreed
15.	Inability of parents/guardians to provide students with the materials required for clothing and textile practical lessons.	2.99	Agreed
16.	Inability of the school authorities to adequately equip clothing and textile laboratory affect the students' performance and interest in the subject.	2.97	Agreed

Research Question 3

What are the strategies for enhancing teaching and learning of clothing and textiles?

In Table 5, the respondents agreed that all the strategies above will enhance teaching and learning of clothing and textile in Abia State Secondary schools. Evidence of which is shown on the respondents mean scores which were all above the acceptable mean score of 2.50.

Table 5 Mean responses of subjects (the teachers and the students) on the strategies for enhancing teaching and learning of clothing and textiles

S/N	Strategies	Mean X	Remark
	The following strategies will enhance teaching and learning of clothing and textiles in secondary schools.		
17.	Parent and teachers should encourage the student to have a positive attitude towards learning clothing and textiles as a subject.	3.52	Agreed
18.	Government should employ competent teachers to handle clothing and textiles in secondary schools in the state.	2.92	Agreed
19.	School authorities should provide adequate facilities in schools for teaching and learning clothing and textiles in order to make the learning interesting and motivating.	3.61	Agreed
20.	The school authorities should assist students by provides some of their requirements for practical lessons.	2.79	Agreed
21.	Enough time and space should be allotted for effective teaching and learning clothing and textiles.	2.76	Agreed
22.	Clothing and textile teachers should try to catch and retain the students' interest during clothing and textile lessons for a more effective and interactive learning session.	3.55	Agreed

Discussion

Clothing and textiles as one of the major areas in Home Economics has the capability of equipping students with various skills in preparation for the world of works after graduation from schools. However, there are numerous impediments to actualizing these noble objectives at secondary school level in Abia State. In this study, the respondents mean score in Table 3 showed that all the challenges enumerated there are facing teachers of clothing and textiles in Abia State secondary schools. The highest mean score was 2.99, item no. 5 which bothers on inability of the parents to provide their children/wards with materials needed for the clothing and textile practical lessons and inability of teachers to improvise. This is in line with the work of Ogwo and Oranu (2006) which stated that inadequate materials and unwillingness of teachers to improvise is a great impediment to Home Economics practical lessons. This is followed by item no. 4 which bothers on Poor perception of parents/students and the Students' lack of interest in Clothing and Textile subject. It may be because of this reason that makes the students to feel bored in clothing and textile lessons.

In this regard it is clear that both parents and students consider money spent on doing clothing and textile practical as a waste, and some students see clothing and textile career as a job for illiterates and low achievers. This is in line with the findings and observation made in focus group discussion title Career choice by Femi (2014) which the researcher was a participant, In that focus group discussion, parents and students were also participants, some parents were asked what their children will read in higher institutions of learning? One of the parents responded and said that his son will read medicines, law or pharmacy and not courses like clothing and textiles which is meant for low performing students. Also a clothing student who is very good in making crafts, other clothing articles and has even be making money from numerous articles he has been producing was asked if he will continue with clothing and textiles in higher institutions so as to acquire more skills and become a clothing specialist. The boy said he is very much interested but his parents will not allow him because they have been asking him at home why he decided to picked so a great interest in clothing which is meant for female careers and some male who are not doing well academically. This really showed that some people perceive clothing and textiles as a course/career for illiterates, low achievers or none performing students.

It seems that some of the clothing and textile teachers' challenges also affect the students. For instance, in Table 4, the Inability of the parents to provide their children/wards with materials needed for the practical lesson which is also a teachers' problem also affect the clothing and textile students. The clothing and textile teachers under such condition will not be able to deliver an effective instruction neither will the student be able to comprehend the teachers' demonstration without materials needed. The study also revealed that some teachers use difficult methods in teaching practical lessons eg. clothing construction. This shows incompetency on part of the teachers and it is in line with Lemchi (2001) who stated that the problem of the clothing and textile students could be attributed to the teachers in Nigerian schools especially in secondary/tertiary institutions where clothing is thought only peripherally without the teacher making serious effort to make the students proficiency in the course. Iyere and Anerua (2004) pointed out that this could be due to lack of teachers or presence of unqualified teachers handling the subject. Iyere (2000) in agreement stated that inadequacy of equipment in clothing and textiles laboratory is a major problem. She

explained that this situation makes both the teachers and the students to concentrate on the theoretical aspect of the course forgetting that it is also practical oriented and is meant to impact skills on the students. The world is dynamic, so clothing and textile programmes should be dynamic also. It should change with the changing time. Simplified methods of clothing construction text books should be introduced. Clothing and textile experts should rise up to this challenge and write simplified text books on clothing and textiles. Igbo and lloeje (2012) has started by writing a simplified text book title: Basics of Dress Pattern Drafting, which is on sale now in various book shops in Nigeria. Other clothing specialists should follow the same vision. Acquisition of skills in clothing and textiles should be encouraged at secondary school levels which seem to be a foundation where other skills in this saleable subject should be laid for higher level of education. The secondary school authorities in the state should wake up from sleep and sort ways of encouraging and sustaining interest of both the teachers and the student of clothing and textiles by adequately equipping clothing and textile laboratory and funding practical lessons as well.

The respondents mean scores in Table 5 showed that the strategies identified by the study will enhance teaching and learning of clothing and textile in Abia State Secondary schools. The findings is in agreement with Iyere (2007) who stated that efforts should be geared towards training a large number of teachers to acquire a more competent and updated skills in clothing and textiles. These teachers on successful completion of the training will be posted into secondary schools to handle the teaching of clothing textiles in secondary schools.

In Nigeria, unemployment of youth is one of the major challenges facing the country. Inculcation of clothing and textile skills in the life of the students will equip the students in the world of works after graduation. Furthermore, it will also make them to be job creators and employers of labour instead of job seekers as is the order of the day in Nigeria today. Also cases of armed robbery, kidnapping and terrorism will be minimal in the country. Idle man's brain they said is the devil's workshop. Acquisition of skills in clothing and textiles will keep the interested youths busy and the mind of laying ambush and waylaying people on the way will be a thing of past in the country.

Conclusion

The study has provided information on the challenges/problems of teaching clothing and textile in secondary schools in Abia State. Some challenges facing teachers and students were identified. Also identified are the strategies for enhancing the teaching and learning of the subject. The findings of this study has shown that the challenges/problems of teaching and learning clothing and textile in secondary schools have affected the students in so many ways, it has resulted to low enrolments of students in clothing and textiles in West African School Certificate Examination, consequently, many students are erroneously missing the skills endowed in the subject and the transfer of the knowledge into their respective families and in the society at large is missing, they cannot be creative and also learn proper dress sense. A lot indeed is missing out.

Recommendations

Based on the findings of the study, the following recommendations were made

1. Abia State government should train clothing and textile teachers to in- service training to acquire competent skills in the subject. The teachers on successful completion of the training should be posted into many schools to train the clothing students alike.
2. School authorities should build new and adequately equip both the newly built and already existing clothing and Textile laboratories in various schools in the state.
3. The school authorities should motivate both the performing teachers and students by giving the teachers incentives, giving prizes/scholarship for outstanding performing student in clothing and textile subject.
4. Parents/guardians should encourage their children/ wards into acquiring skills in clothing and textiles. They should also provide the requirements for their children's practical lessons and not abandoning that responsibility to the teacher or school authority alone.
5. Current and seasoned clothing and textiles textbooks should be provided in the school library. Through these ways, teaching and learning of clothing and textiles in the state will be enhanced and the students' interest should be captured and sustained in clothing and textiles subject.

Biography

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Physical, Chemical, and Sensory Properties of Glass Noodle Supplemented with Jerusalem Artichoke Flour

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Abstract

Jerusalem artichoke flour is a starchy food that contains the derivation of function food ingredients such as inulin, oligofructose and fructose that having both nutritional and functional attributes, particularly beneficial to diabetes and obesity. The objective of this study was to develop glass noodle with Jerusalem artichoke flour added to make products of high nutritional quality with low carbohydrate digestibility. The effect of mung bean flour substitution with Jerusalem artichoke flour was investigated in terms of the physical, textural and sensory qualities of glass noodle. Five additional glass noodles were prepared by substituting mung bean flour with 10, 20, 30, 40 and 50% Jerusalem artichoke flour. The optimal ratio of glass noodle from Jerusalem artichoke flour was investigated using sensory qualities in comparison with the control (100% mung bean flour). The results of glass noodle formula development indicated that as the amount of Jerusalem artichoke flour increased, the elasticity of glass noodles decreased and the color became darker. The optimum formula consisted of 40% Jerusalem artichoke flour was used to replace mung bean flour. Glass noodle were composed of 0.48% protein, 0.36% fat, 7.00% dietary fiber, 51.18% carbohydrate and 5.20% inulin. The elasticity was 2.15 g/cm. The results of consumer evaluation showed that the overall liking were at the moderate level. The present study indicated that Jerusalem artichoke flour is a potential source of fiber when substituted for mung bean in glass noodle products and significantly increased their total dietary fiber and inulin content.

Keywords: Glass noodle, Jerusalem artichoke, supplement, Inulin, mung bean flour

Introduction

Glass Noodles or Mung Bean Noodles is one of traditional oriental foods popularly consumed both as a noodle food and in dish throughout Asian countries (Takahashi et al., 1985). Most glass noodles contain only one ingredient: mung bean flour or starch. The process involves taking mung bean starch, plus water to create the noodle dough and cooking it until it gelatinizes. This gelatinized portion is then added back to remaining starch and more water is mixed in. Adding this gelatinized portion allows the kneading to form a paste-like consistency that can be put into a cylinder, compressed and extruded into boiling water to form the glass noodles. After a short cooking time the glass noodles are cooled in tap water. Some glass noodles also contain salt, and some are enriched with additional vitamins and minerals. The quality that consumers look for in glass noodles is firmness, high elasticity and unsticky. Traditional noodles are rich in carbohydrates but lack other essential nutrients, such as dietary fiber, vitamins, and minerals, which are already lost during flour refinement (Choo

and Aziz, 2010). Thus, many studies have been conducted to improve the nutritional qualities of traditional noodles such as Ge and other (2001) mixed 15% defatted wheat germ flour (DWGF) with wheat flour and produced DWGF noodles with very good nutritional properties, being high in amino acids, minerals, and B vitamins, and good quality characteristics, Torres and other (2007) developed a formulation of pasta with germinated pigeon pea (*Cajanus cajan*) seeds. The germination process reduced the content of phytic acid and the activity of trypsin inhibitor, as well as increased vitamin B2, C, E and total antioxidant capacity. Furthermore, mung bean starch is much more expensive than other starches. So looking for other materials substitute mung bean totally or partly will be valuable. The utilization of different substrates for starch noodles includes other tuber starch.

Jerusalem artichoke is a plant native to North America. Jerusalem artichoke is a natural raw material for the derivation of a number of functional food ingredient such as inulin, oligofructose and fructose (Roberfroid, 1993) that are prebiotic that stimulates the growth of beneficial bacterial in the digestive tract that in turn aids digestion and lowers blood pressure and cholesterol (Bornet, 1994). According to meet consumer demands for increased eating quality and diverse functionality of food, many additives have been develop and are used in noodle products. These includes (1) protein supplements to serve as gluten fortifier to give better cooking and nutritional characteristics. (2) emulsifiers and edible gums to improve the surface properties and eating qualities. (3) antioxidants and preservatives to prevent deterioration of color and extend the microbial shelf life of fresh noodles. (4) various plant-based or animal-base supplements like dietary fiber (Bustos and other, 2011). So, adding Jerusalem artichoke for instead mung bean, its applications as functional food, bioactive ingredient sources and reduce carbohydrates. Therefore, the objective of this study was to develop glass noodle with Jerusalem artichoke flour added to make products of high nutritional quality with low carbohydrate digestibility. The effect of mung bean flour substitution with Jerusalem artichoke flour was investigated in terms of the physical, textural and sensory qualities of glass noodle

Materials and Methods

Jerusalem artichoke flour preparation

Jerusalem artichoke was purchased from a local market in Pathum Thani province, Thailand. Jerusalem artichoke flour were peeled and cut into 1 mm slices. The slices were dried at 60 °C until aW were 0.6 and mashed by using a commercial grinder and stored at 25 °C in sealed plastic containers prior to further study. The commercial mung bean flour used for this study was also obtained from the local market.

Glass noodle processing

Glass noodles were prepared in the laboratory following the procedures of Bui and Small (2007). The basic glass noodles contain only one ingredient was mung bean flour and five additional glass noodle samples were prepared by substituting mung bean flour with 10, 20, 30, 40 and 50% Jerusalem artichoke flour.

The different formulations were processed into glass noodles by plus 10 time of water into 5% of flour and cooking until gelatinize (90°C 15 min.). This gelatinize portion was mixing with 95% of remaining flour. Kneading by using Kitchen Aid mixer for 30 min. During kneaded, water was added to give a homogeneous composition. The homogeneous paste was extrude into the boiling water and after cooked the glass noodle were cooling with cold water to form the glass noodle.

Color analysis

The color of the glass noodles samples were measured with a Chroma-meter (Minolta, Tokyo, Japan) equipped with a D65 illuminant using the CIE L*a*b* system. The L*, a* and b* readings were obtained directly from the instrument and provided measures of lightness, redness a yellowness, respectively. All measurements were performed in triplicate.

Texture analysis

Elasticity is defined as the tensile strength/elongation of glass noodles were determined by tensile test use texture analyzer (Texture Analyser TA-XT2). For this purpose, individual glass noodles (diameter 0.45-0.5 mm) were wound round and upper and lower round holder of the instrument, so that the intermediate space was 50 mm. The glass noodles were then extended at 1 mm/s up to break point and stress-strain diagram was recorded. From the maximum required force to break a glass noodle and the elongation of the noodle at the time point of break, the ratio force/distance in g/cm. was calculated as a measure of the elasticity.

Sensory evaluation

All glass noodles samples were prepared for sensory evaluation. The samples were then stored for not more than 30 min in tightly covered plastic food containers before testing. Optimally cooked noodles with soup were evaluated for appearance, flavor, firmness, softness and overall liking of the samples by 50 untrained panelists using nine-point hedonic scales, where 9 = extremely like and 1 = extremely dislike. Each panelist evaluated six samples (identified by unique three-digit codes) in a balanced sequential order. The optimal ratio of Jerusalem artichoke flour in the glass noodles was investigated using sensory qualities in comparison to the control noodles. The higher rating indicated good quality attribute.

Chemical analysis

The chemical proximate compositions of glass noodles samples prepared from the optimal ratio of mixtures of Jerusalem artichoke flour per mung bean flour was determined as follows. The moisture content was determined by American Association of Cereal Chemists methods 990.19 (AACC, 2000). Protein was analyzed according to American Association of Cereal Chemists methods 46-13(AACC, 2000). Total dietary fiber (DF) was evaluated using Official Methods of Analysis 985.29 (AOAC,1999). Carbohydrate was measured by Official Methods of Analysis (AOAC, 2000). All analyses were performed in triplicate.

Consumer evaluation

Glass noodles samples prepared from the optimal ratio of mixtures of Jerusalem artichoke flour per mung bean flour were analyzed by the consumers in a central location. One hundred consumers aged between 18 and 40 years with no previous experience in sensory analysis were recruited from Rajamungala University of Technology Thanyaburi, Thailand. Consumer evaluated samples of glass noodles with soup using the same nine-point hedonic scales. The attributes for the glass noodle samples were appearance, flavor, firmness, softness and overall liking. The consumers were briefed on how they should perform the evaluations. In addition, they were asked to give their purchase intentions and overall impression of the glass noodles supplemented with Jerusalem artichoke flour.

Statistical analysis

The means and standard deviations were determined for all the physical, chemical and sensory qualities studied. The significant difference of mean values was assessed with one-way analysis of variance (ANOVA) followed by Duncan's test using SPSS software at a significance level of ($p < 0.05$).

Results and Discussion

The optimum formulations

Color analysis and texture analysis

Color is the one of important parameter used by the consumers to evaluate visual quality and are useful for better marketability of noodles (Asenstorfer et al., 2010) Color is a clear indicator of quality, as fresh noodle are expected to maintain white colored appearance. It has been reported that high quality noodles to be characterized by the presence of consistent and long with white and translucent color (Fu, 2008)

Color characteristics of glass noodles supplemented with Jerusalem artichoke flour are shown in Table 1.1. The results indicated that as the amount of Jerusalem artichoke flour increased, L^* and b^* significantly decreased but a^* significantly increased. L^* expresses the lightness of sample, the a^* -value expresses the red-green color and the b^* -value expresses the blue-yellow color the sample. The glass noodles with increases Jerusalem artichoke flour grew darker, more green and more yellow. Color characteristics of glass noodles which influence enzymatic browning associated with polyphenol oxidase of Jerusalem artichoke tubers (Hatcher et al., 2008). Darkening usually happens due to the protein content of noodles according to chemical properties that indicated the glass noodles with 40% Jerusalem artichoke flour were increased protein content. The higher protein content, the higher is the tendency for noodles to get darkened (Asenstorfer et al., 2010).

Table 1 Color and texture characteristics of glass noodles supplemented with Jerusalem artichoke flour

Amount of Jerusalem artichoke flour (%)	L*	a*	b*	Elasticity (g/cm)
0	70.13 ^a ± 0.95	0.17 ^e ± 0.15	14.45 ^a ± 0.26	2.25 ^a ± 2.17
10	70.00 ^a ± 0.76	0.23 ^d ± 0.44	12.11 ^b ± 0.35	2.22 ^a ± 3.10
20	69.36 ^a ± 0.56	0.33 ^c ± 0.38	12.09 ^b ± 0.48	2.20 ^a ± 2.49
30	69.28 ^{ab} ± 0.61	0.35 ^c ± 0.27	11.65 ^c ± 0.78	2.18 ^a ± 3.15
40	69.12 ^b ± 0.83	0.67 ^b ± 0.17	10.73 ^d ± 0.25	2.16 ^{ab} ± 1.85
50	68.75 ^c ± 0.58	0.74 ^a ± 0.16	10.11 ^d ± 0.51	2.00 ^b ± 2.77

Values are shown as mean ± SD; n=3. Different superscript letters in a column indicate significant difference ($p \leq 0.05$) Texture has been recognized as the second most assessed sensory property of food. In noodles, texture properties that are important are elasticity. Elasticity is defined as the ability of deformed noodles to return to its initial shape and size when the force creating the deformation is removed. The result from this study showed that glass noodles with 40% Jerusalem artichoke flour had elasticity non-significant with control (glass noodles with 0% Jerusalem artichoke flour). Previously, high quality noodles have been correlated with high elasticity (Chen et al., 2002).

Sensory evaluation

In the present study, the sensory evaluation of optimally supplemented with Jerusalem artichoke flour (by percentage) for preparation of glass noodles. The mean sensory liking scores for appearance, flavor, firmness, softness and overall liking of optimal glass noodles supplemented with Jerusalem artichoke are shown in Figure 1.

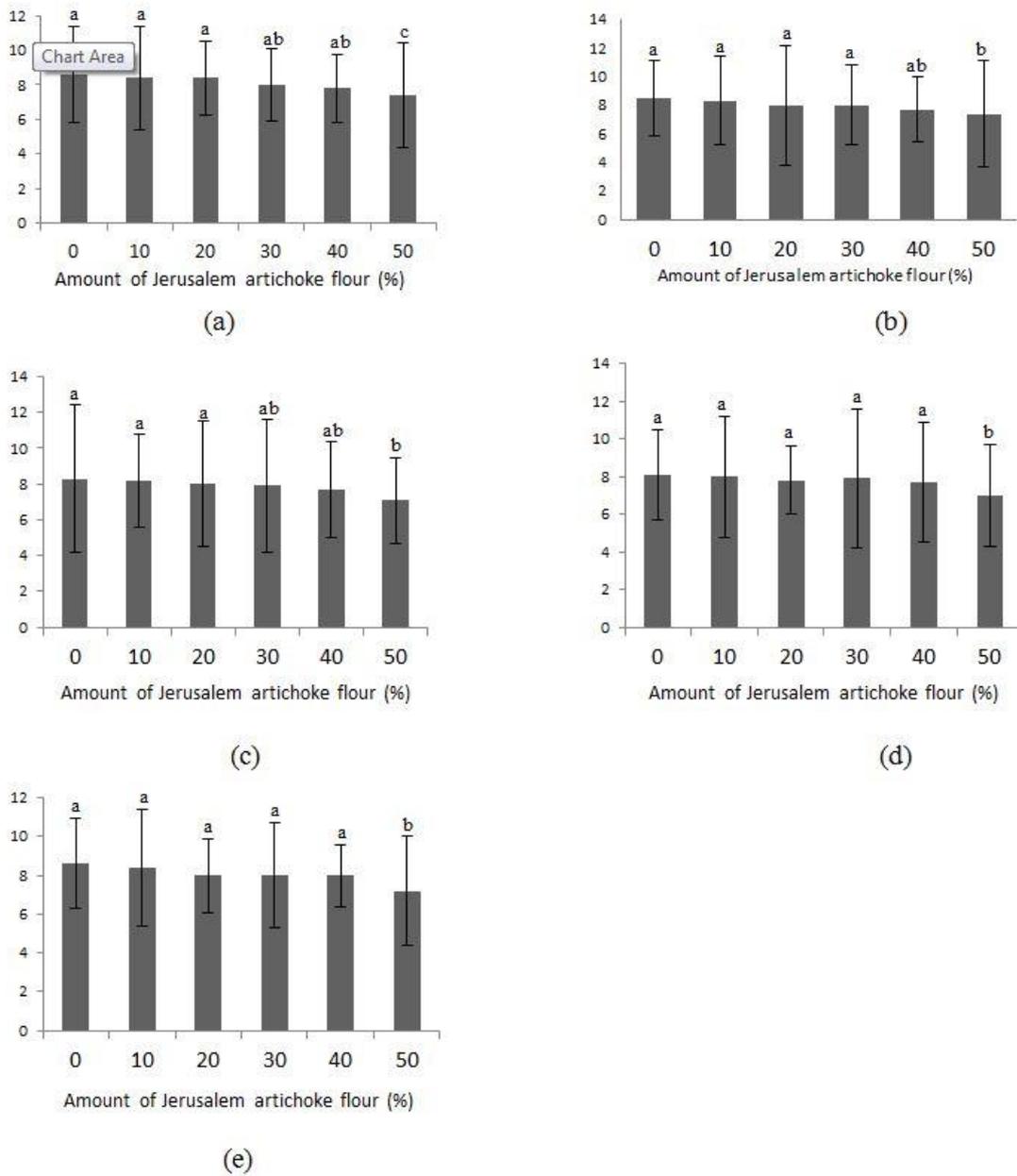


Figure 1 Effect of Jerusalem artichoke flour (%) on sensory liking scores for : (a) appearance, (b) flavor, (c) firmness, (d) softness, (e) overall liking of glass noodles. The same letter above columns indicated there was no significant difference ($p \geq 0.05$). The vertical bars on each column indicated the standard deviation

Glass noodles Properties

The glass noodles with 40% Jerusalem artichoke flour was then analyzed chemical properties, physical properties and consumer test compared with commercial glass noodle. The result were presented in Table 2.

Table 2 Chemical, physical and sensory properties of optimally glass noodles supplement with 40% Jerusalem artichoke flour compared with commercial glass noodle

Properties	Amount	
	Glass noodles with 40% Jerusalem artichoke	Commercial Glass Noodle
Chemical properties		
Protein* (%)	0.48 ± 0.87	0.13 ± 0.67
Fat* (%)	0.36 ± 1.12	0.60 ± 1.04
Dietary fiber* (%)	7.00 ± 1.07	0.46 ± 2.00
Carbohydrate* (%)	51.18 ± 1.54	80.39 ± 1.16
Inulin*(%)	5.20 ± 0.78	0.00
Physical properties		
Elasticity (g/cm)	2.15 ± 2.66	2.25 ± 2.12
Consumer evaluation		
Appearance ^{ns}	8.1 ± 2.87	8.3 ± 3.02
Flavor*	7.8 ± 3.11	8.7 ± 2.15
Firmness ^{ns}	8.3 ± 3.63	8.6 ± 2.75
Softness ^{ns}	8.2 ± 2.67	7.9 ± 1.18
Overall liking ^{ns}	7.9 ± 3.45	8.2 ± 3.12

Chemical properties

The chemical compositions of glass noodles with 40% Jerusalem artichoke flour could be observed that dietary fiber and inulin were more than commercial glass noodle (0.46 and 0% respectively) ($p < 0.05$) The polysaccharide inulin is a soluble dietary fiber, which is not degraded by enzyme in the human digestive system, but fermented selectively by beneficial bacteria in the gut. Inulin and its degradation products are prebiotics, which are compound capable of stimulating and/or activating health-promoting bacterial growth in the colon (Gibson and Roberfroid, 1995). Moreover, inulin also increases blood glucose level less than starch, and it is therefore suited as a constituent in an anti-diabetic diet (Rumessen et al., 1990).

Physical properties

The elasticity of glass noodles with 40% Jerusalem artichoke flour was non-significant with commercial glass noodle (Table 1.2). Previously, high quality noodles have been correlated with high elasticity (Chen et al., 2002). Texture properties (elasticity and firmness) are important attributes of cooked noodles as it determines consumer acceptance of product (Dexter et al., 1985; Hatcher, 2010)

Consumer evaluation

Nowadays, Consumers demand certain quality standards for the noodle products they eat such as the firm, elastic, smooth, and chewy texture, as well as acceptable taste, nutritional, qualities and functional properties (Li et al., 2012). For consumer evaluation, this questionnaire asked for demographic, acceptance test and purchase intentions of the glass noodles supplemented with Jerusalem artichoke flour. One hundred consumers (46 males and

54 females) participated in the consumer test. The result that 91% of consumer accepted the product and 86% of the consumers were willing to purchase it. The appearance, firmness, softness and overall liking scores of glass noodles with 40% Jerusalem artichoke flour were at the very like level and non-significant with commercial proroduct ($p > 0.05$) (Table 1.2). But the flavor of glass noodles with 40% Jerusalem artichoke flour were significant with commercial proroduct ($p < 0.05$) because the most abundant group of volatile compound in Jerusalem artichoke tuber is terpenes (Radulovic et al., 2011) and developed when Jerusalem artichoke flour were boiled. According to this consumer test, the category of invention and health product was the main reason for the consumption of glass noodles supplemented with Jerusalem artichoke flour.

Conclusion

Jerusalem artichoke flour could be added to glass noodles up to the level of 40% without any significant change in physical and sensory characteristics. Glass noodles made from 40% Jerusalem artichoke flour were considered and subsequently used for analyzed chemical properties, physical properties and sensory properties The chemically as they contained appreciable amounts of protein (0.48%), fat (0.36%) and dietary fiber (7.00%), carbohydrate (51.18%) and inulin (5.20%). The physically in terms elasticity was 2.15 g/cm. The overall liking was very like. Jerusalem artichoke flour is a potential source of fiber when substituted for mung bean in glass noodle products and increased their total dietary fiber and inulin content.

Biography

Assistant Professor Dr Orawan Oupathumpanont, Professor and Researcher in Faculty of Home Economics Technology at Rajamangala University of Technology Thanyaburi, Thailand. I received my PhD in Agro-industry Product Development, Kasetsart University, Bangkok, Thailand. Her primary interests are in the field of nutrition product and process development. In 2010, her research "Hygienic Thai Fermented Rice Noodle" was received Silver Prize From Korea International Woman's Invention Exposition 2010 (KIWIA 2010).

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Home economics, happiness and literacy: Pulling the threads together

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Abstract

Well-being researchers have identified many variables related to happiness. For home economists, the notion of well-being has arguably underpinned our field for more than a century and hence our connections with happiness have also been fundamental to our philosophical development, though interestingly not generally in an explicit way. Recently, Rutledge, Skandali, Dayan & Dolan (2014) developed a mathematical equation to predict how self-reported happiness depends not on how well things are going, but whether things are going better or worse than expected—in other words, our expectations. In this paper the formula is considered and the issue of expectations and how it relates to the field of happiness, with connections to the field of home economics, are explored through the lens of the formula. Connections are then made to the need for Home Economics literacy which brings with it the capacity to establish realistic expectations. The impact for the profession and future actions is considered.

Keywords: Happiness, home economics literacy, wellbeing

Literature Review

Home economics, wellbeing and happiness

Contemporary Home Economics is foregrounded by a longstanding commitment to optimising the well-being of individuals and families. According to the International Federation of Home Economics (IFHE) *Position Statement Home Economics for the 21st Century* (IFHE, 2008, p. 1):

Home Economists are concerned with the empowerment and wellbeing of individuals, families and communities, and of facilitating the development of attributes for lifelong learning for paid, unpaid and voluntary work; and living situations.

The Position Paper notes that the profession is enjoying renewed attention because of the effects on individuals and families of the complexity, diversity and unpredictability of the world in which we live, and a desire to optimise individual and family wellbeing in this context. Understandings of the notion of wellbeing have been under consideration in the profession for some time, and although the focus of this paper is not to revisit the definitions and understanding of wellbeing, it is helpful to provide some broad insights into the notions of wellbeing and how this connects with the concept of happiness.

In 1995 Henry, a leading scholar in home economics philosophy, published an annotated bibliography exploring the meaning of wellbeing. Although this literature is now two decades old, it serves to highlight the often taken-for-granted connection between wellbeing and happiness, and between these concepts and home economics. Many of the works cited made the connection between the two, with Bradburn for example—as far back as in 1969—equating happiness with wellbeing. This trend continues across the review, linking wellbeing and happiness together. However, the lack of definition between wellbeing and happiness is complicated by the notion of quality of life, which also appears in the review of these key wellbeing resources. The review points to hierarchies of quality of life which are measurable, and hence enabling an objective measure of wellbeing and possibly happiness.

Henry's review also points to the importance of fulfilling needs, and in particular points out that many of the authors refer to Abraham Maslow's Hierarchy of Needs (Maslow, 1971) as the underpinning basis for determining wellbeing. In this hierarchy, needs are met in a hierarchical way with the ultimate goal of achieving self-actualisation. Henry notes that McCall (1975), for example, claims that happiness comes about from satisfying needs—as per Maslow's hierarchy—not desires. Interestingly, Maslow's Hierarchy of Needs has been the basis for considerable philosophical understandings in home economics literature and is almost a taken-for-granted basis for the field - but is often not explicitly stated. Henry's review also points to a more elusive or subjective aspect of wellbeing, which is more challenging to measure other than by the individual concerned.

Happiness as subjective wellbeing

The tendency to shift between happiness and wellbeing, underpinned by the fulfilment of needs with the goal to achieve self-actualisation, is consistent in the literature beyond the insights offered by Henry (1995) including some of the seminal pieces presented in the edited collection on subjective wellbeing offered by Strack, Argyle and Schwarz (1991). For instance, Veenhoven (1991:8) argues that happiness research is problematic and indeed the "history of happiness research is the history of confusion" for a range of reasons including in general a lack of shared meaning. Veenhoven continues, pointing to the field of wellbeing as offering the best way to capture the elements of happiness, shaping its dimensions as individual and collective; subjective and objective. This classification, developed from Veehoven (1991) is presented in Table 1.

It is useful to note that needs gratification and self-actualisation, which is the pinnacle of Maslow's Hierarchy of Needs, also appears in this matrix as part of individual, objective wellbeing.

The field of positive psychology has further assisted to define the relationship between happiness and wellbeing explaining that subjective well-being is used more lately in research literature as a substitute for the term *happiness* (Boniwell, 2015). Thus, it encompasses how people evaluate their own lives in terms of cognitive and affective explanations. According to Boniwell, this can be represented by the following equation:

$$\text{Subjective wellbeing} = \text{satisfaction with life} + \text{affect}$$

Table 1 Classification of wellbeing concepts

	Objective wellbeing	Subjective wellbeing
Individual wellbeing	Personal qualities e.g. Wisdom Stability Creativeness Need gratification Self actualisation	Self-appraisals eg Job satisfaction Self esteem Contentment
Collective wellbeing	Societal qualities eg Coherence Justice Equality Stability	Social opinion Acceptance of political order Trust Belief Liveability

Source: Developed from Veerhoven, 1991

In this concept, the cognitive aspect of subjective wellbeing is expressed by life satisfaction, which represents one's assessment of their life. According to positive psychology, a person is satisfied when there is little or no discrepancy between the present and what is thought to be an ideal or deserved situation - that is, their expectations. On the other hand, dissatisfaction is a result of a substantial discrepancy between present conditions and expectations. The other element of this equation is affect, which represents the emotional side of subjective wellbeing (happiness). The notion of affect comprises both positive and negative moods and emotions that are associated with our everyday experiences (Boniwell, 2015).

At the collective level there have been an increasing number of studies into wellbeing. For example, the recently released *State of Global Well-being* (Healthways, 2014) provides country wellbeing rankings based on an index that measures wellbeing across five elements - purpose, social, financial, community and physical—with each being categorized as thriving, struggling or suffering. Purpose relates to liking what you do each day and being motivated to achieve goals; social relates to having supportive relationships and love in life; financial relates to managing economic life to reduce stress and increase security; community relates to liking where you live, feeling safe and having pride in the community; and finally, physical relates to having good health and enough energy to get things done daily. Interviews were conducted with 146 000 adults in 145 countries. The aggregate of the wellbeing measures of the individuals and families in each country lead to a country index, and ultimately provide insight into wellbeing at a global scale. At a glance, Panama leads all other countries in wellbeing, with 53% of those interviewed thriving in 3 or more elements. Afghanistan ranks last with no residents thriving on any of the five elements of wellbeing. Australia ranked 40th with 25% of respondents thriving in 3 or more elements and South Korea 117th with 9% of residents thriving in 3 or more elements. What this data provides is a snapshot in time that can be used by those invested with the capacity to work to enhance wellbeing with an objective measure from which to focus future efforts.

Happiness and expectations

The focus for this paper is derived from a recent study that set out to investigate the relationship between rewards and self-reported happiness. The power of mathematics has from time to time been applied to the dynamics of happiness, so this study, like that of

determining subjective wellbeing, is a novel approach to this complex work. The study by Rutledge, Skandali, Dayan & Dolan (2014) revealed that “happiness depends not on how well things are going, but whether things are going better or worse than expected” (p.1). They devised a formula to capture the essence of their findings, as presented in Figure 1:

$$\text{HAPPINESS } (t) = w_0 + w_1 \sum_{j=1}^t Y^{t-j} CR_j + w_2 \sum_{j=1}^t Y^{t-j} EV_j + w_3 \sum_{j=1}^t Y^{t-j} RPE_j$$

Figure 1 Happiness formula

Following is an explanation of the theory:

Happiness depends on safe choices (certain rewards, CR), expectations associated with risky choices (expected value, EV), and whether the outcomes of risky choices were better or worse than expected. This final variable is called a reward prediction error (RPE), the difference between the experienced outcome and the expectation. The neurotransmitter dopamine is thought to represent these signals which might explain how people learn about rewards (if you get more than you expected, next time you should expect more) (p.3).

Rutledge et al. (2014) use external quantifiable objects (monetary rewards) to cause emotional responses in their participants, demonstrating momentary episodes of happiness or subjective wellbeing (SWB). Momentary SWB is different from overall life satisfaction (see Figure 2).

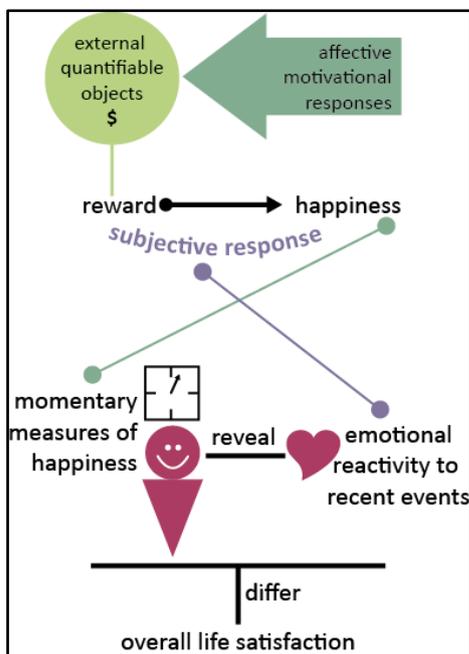


Figure 2 Theoretical framework (Rutledge et al., 2014)

The researchers’ experiment demonstrated that it was not rewards alone that result in momentary SWB, but the cumulative influence of reward expectations and prediction errors (see Figure 3 and Figure 4.)

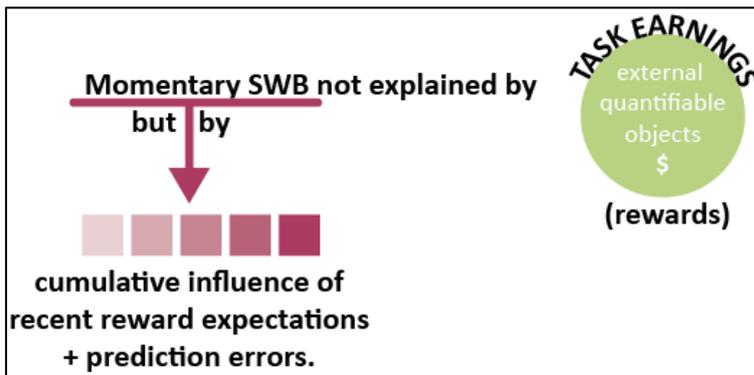


Figure 3 Rutledge et al., 2014—Not the rewards but prediction errors and expectations

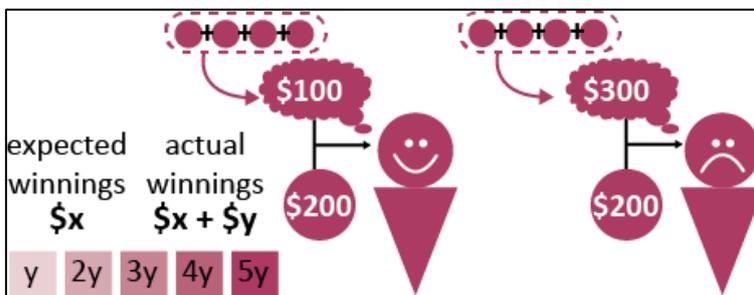


Figure 4 Cumulative prediction errors/expectation results

In unpacking the formula, there may be a deduction that having low expectations is the secret to happiness. However, the researchers argue this is not the case as low expectations make it more likely to exceed expectations and this affects happiness before the outcome is known, thereby diminishing the effect if expectations are exceeded. They conclude that setting accurate expectations provides the best opportunity for happiness. Happiness has the added benefit of being very useful for making decisions, hence always being happy is also not a highly desirable situation. The researchers conclude that ...

... being able to predict happiness based on past rewards and expectations bring us one step closer to understanding happiness. By studying how happiness depends on the interaction between our brains and our environment, we hope to yield insights that contribute to the important goal of improving human well-being (p.4).

It is important to note that the equation relates specifically to momentary subjective wellbeing. Nevertheless, extensive literature informing the philosophy of *The Happiness Institute*, reiterates the conviction that happiness depends not on how things are going, but whether things are going better or worse than expected, the argument posited by Rutledge, Skandali, Dayan & Dolan (2014).

The Institute argues that achieving happiness is underpinned by practicing predictable strategies every day, with the word *choose* the acronym to capture these which are now described in Table 2.

Table 2 Happiness strategies

Strategy	Applied to:	Description
C = Clarity	goals, direction and life purpose	Happy people set clear goals and determine clear & specific plans to ensure these goals become reality.
H = Healthy Living	activity & exercise, diet & nutrition, and sleep	Health forms a crucial part of the foundation to happiness. It's hard to be happy if you're literally sick and tired all the time. So do whatever you can to be healthy and you'll also boost your chances of being happy.
O = Optimism	positive but realistic thinking	There's no doubt that happy people think about themselves, others and the world differently. Among other things, they search for more positives. The good news is that this is something you can learn to do so start practicing now.
O = Others	key relationships in your life	Research strongly indicates that happy people have both more and better quality relationships. So make sure you devote time to developing and fostering your key relationships.
S = Strengths	core qualities and attributes	Rather than spending all their time trying to "fix" their "weaknesses", happy people spend more time identifying and utilising their strengths. Find out what you're good at and do it as much as possible.
E = Enjoy the moment	live in, and appreciate the present	The past is history, tomorrow's a mystery, and today's a gift - that's why they call it "the present". Live in the moment and enjoy life more. So CHOOSE to be happy now! Because life's too short not to be happy.

Source: The Happiness Institute

These predictable strategies combine with expectations to ensure that happiness can be achieved and hence subjective wellbeing also fulfilled. So, is it possible or desirable to achieve happiness for individuals and communities in an ongoing manner, that is, to achieve a sustainable model of happiness and wellbeing?

Home economics and happiness

The individual/collective and objective/subjective dualisms of meaning associated with wellbeing have over time led to some useful insights and strategies to enhance happiness and wellbeing. It is from this perspective that a direct link can be made to the field of home economics.

Interestingly, the International Federation of Home Economics (IFHE) *Position Statement Home Economics for the 21st Century* (IFHE, 2008) does not include the words *happy* or *happiness* in the statement. However, *wellbeing* appears five times in the two page document. The omission of the term *happiness* points to the likelihood that subjective wellbeing is not as prominent as a conception in the field as is objective wellbeing. When reflecting on the terms presented in Table 1, especially around individual wellbeing, the position statement refers to *needs*, the fulfilment of which are crucial for objective wellbeing and which are explicitly stated as one of the three dimensions of practice of the field identified as essential for all subjects, courses of study and professionals in the field:

- a focus on fundamental **needs** and practical concerns of individuals and family in everyday life and their importance both at the individual and near community levels, and also at societal and global levels so that wellbeing can be enhanced in an ever changing and ever challenging environment;

- the integration of knowledge, processes and practical skills from multiple disciplines synthesised through interdisciplinary and transdisciplinary inquiry and pertinent paradigms; AND
- demonstrated capacity to take critical/ transformative/ emancipatory action to enhance wellbeing and to advocate for individuals, families and communities at all levels and sectors of society (IFHE 2008, p. 2).

The Position Paper (IFHE, 2008) explains that home economics can be clarified by four dimensions or areas of practice:

- as an *academic discipline* to educate new scholars, to conduct research and to create new knowledge and ways of thinking for professionals and for society
- as an arena for *everyday living* in households, families and communities for developing human growth potential and human necessities or basic needs to be met
- as a *curriculum area* that facilitates students to discover and further develop their own resources and capabilities to be used in their personal life, by directing their professional decisions and actions or preparing them for life
- as a *societal arena to influence and develop policy* to advocate for individuals, families and communities to achieve empowerment and **wellbeing**, to utilise transformative practices, and to facilitate sustainable futures.

These statements directly connect to the ideas presented regarding happiness and wellbeing, and how this connects with sustainable futures. In this regard, home economics as a field is less focussed on subjective wellbeing (happiness) than on wellbeing in the objective dimension. However, given the affluence of contemporary times, the capacity to achieve objective wellbeing is greater than ever before and hence the focus of the profession has more recently extended to include subjective wellbeing. This paper now turns to the data for greater insight into the consideration of happiness in the home economics literature and how this relates to the Home Economics Literacy Model (HELM) (Pendergast, 2015).

Method

In order to better determine the explicit connection between home economics and happiness—taken to be subjective wellbeing—a text analysis of the peak international publication of the field was undertaken. A series of words, derived from the informing literature, were located to report the degree to which the professional literature focusses on subjective wellbeing.

The Journal

The *International Journal of Home Economics* (IJHE) is published electronically twice a year by the International Federation of Home Economics (IFHE). Intended to be an international publication to highlight research and discussion of Home Economics, IJHE utilises a comprehensive peer-review process. The focus of the publication is emergent work in all aspects of home economics. Table 3 provides a summary of the number of articles published in each of the issues across the seven years of publication to date.

Table 3 Number of articles across seven years of publication

Year	Volume	Issue 1	Issue 2	Total	Word count*
2008	1	9	6	15	64,938
2009	2	7	7	14	76,931
2010	3	3	3	6	28,257
2011	4	4	4	8	33,750
2012	5	6	18	24	106,246
2013	6	12	12	24	96,965
2014	7	5	6	11	59,226
Total				102	466,313

*(Nvivo)

For the purpose of this investigation, all papers published in the journal from 2008 to 2014 were included as part of the study.

Data

All 102 articles published in IJHE were converted to Microsoft Word to allow for the removal of headers, footers, references, and other formatting graphics, figures, number-based tables, author details, acknowledgements and notes. Where tables were formatting devices used to layout sentence text in dot points, these were converted to text. A search for words associated with subjective wellbeing was undertaken, with the key terms derived from the literature. These were initially *wellbeing* and *happiness* (and *happy*). After considering the stimulus article (Rutledge et al., 2014) and Henry's (1995) annotated bibliography, other relevant terms were added to the search list, namely *wellness*, *hope*, *needs*, *satisfaction* and *Maslow*.

Wellbeing was spelt both as *well-being* and *wellbeing* across the seven volumes, and all instances of *well-being* (161) were converted to *wellbeing* for consistency. In an initial search for the terms *happiness*, *happy* and *hope* it was clear that not all appearances of these terms were relevant to the research, viz:

- *Happy* was most often used in the context of the authors' evaluation of a concept, or their perception of others' evaluation of concept, rather than an evaluation of life satisfaction; and
- *Hope* was most often a stylistic device used in writing to engage the reader, rather than referring to a participant's viewpoint.

When happiness (happy, hope) was used in any of these ways unrelated to the meaning in this study, it was removed from the frequency count. This process is demonstrated in Table 4, with the column headed 'relevant appearance' identifying only those instances where the word was used according to its relevance to the topic.

Findings and discussion

The frequency of the terms in the articles is presented in Table 4.

In this visual representation of the word association with *needs* in the data set, it is evident that the connection to wellbeing of human, family, home, people and so on relates to fundamental needs as described by Maslow's Hierarchy of Needs.

Having now established that the home economics publications at a global level include considerable emphasis on wellbeing and happiness, the question of how the field goes about this and what the future holds will now be considered.

The role of Home Economics and expectations - HELM literacy

A clear connection can be made between the Home Economics Literacy Model (HELM) (Pendergast, 2015), needs of individuals and families and transformative action for wellbeing, and a number of wellbeing components and measures, including Maslow's Hierarchy of Needs. Figure 6 presents the Home Economics Literacy Model with *needs* and *wellbeing* highlighted.

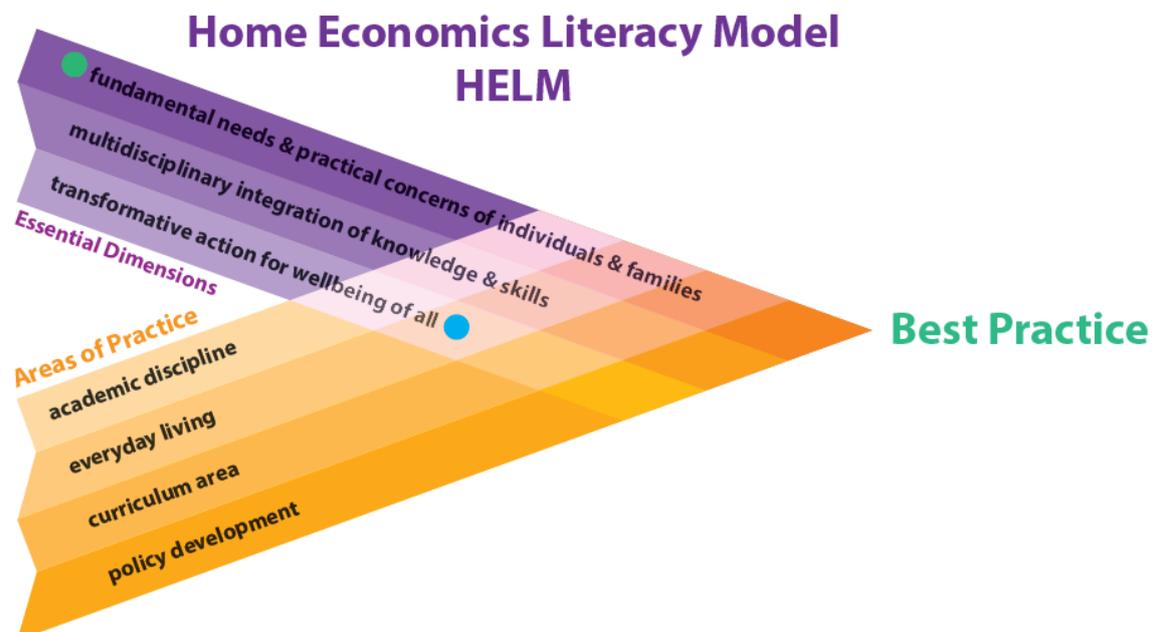


Figure 6 HELM links to wellbeing and Maslow

The frequency of the term *Maslow* as reported in this study indicates that home economics literature incorporates the concepts of needs, and also Maslow's Hierarchy of Needs, along with wellbeing and other relevant terms associated with both objective and subjective wellbeing, and hence happiness. In considering this focus on needs, it is pertinent to return to one of the features that separates individual objective and subjective wellbeing (Veerhoven, 1991) that is, long term—as opposed to momentary happiness—comes about from having needs met. This is clearly an aspiration of the field of home economics, as evident in the HELM visualisation which links together the Essential Dimensions and the Areas of Practice of the field. Also noted in the Essential Dimensions is the goal to “advocate for individuals, families and communities to achieve empowerment and **wellbeing**, to utilise transformative practices, and to facilitate **sustainable futures**” (IFHE, 2008, p.2). It is to the goal of sustainable happiness the HELM approach must now turn.

Sustainable Happiness and wellbeing

O'Brien (2013, p. 295-6) explains the notion of sustainable happiness, defining it as "happiness that contributes to individual, community and/or global wellbeing without exploiting other people, the environment or future generations". This approach is underpinned by a United Nations (UN) resolution recommending that member states give more attention to happiness and wellbeing in their economic and social development policies (UN, 2011). It is argued that with philosophy in place, economic outcomes will consequently be enhanced. Following this 2011 resolution, in 2012 the *World Happiness Report* (Helliwell et al., 2012) was launched, which outlines the benefits of aligning economic and social policy to contribute to wellbeing—for individuals and for all. The intention of this approach is to focus on the notion that individual happiness and wellbeing are intertwined with the happiness and wellbeing of other people, other species, and the natural environment (O'Brien, 2005). In order to achieve this goal, O'Brien argues that education is an important part of the solution "contributing to resilient, sustainable happiness and wellbeing for all" (O'Brien 2013, p. 303). However, O'Brien asks the question, as reflected in the title of her 2013 publication: who is teaching us about sustainable happiness and wellbeing?

The concept of sustainable happiness and wellbeing points directly to education as assisting to achieve the goal of happiness (O'Brien, 2013). As already noted, the International Federation of Home Economics (IFHE) *Position Statement Home Economics for the 21st Century* (IFHE, 2008), while not including the words *happy* or *happiness* in the statement, does include the word *wellbeing* 5 times and the word *sustainable* appears 6 times. It is always incorporated as an adjective, twice as sustainable living; twice as sustainable development and once each for sustainable vision and futures. It appears that achieving sustainable happiness and wellbeing is inherently built into the philosophy of the field.

Summary

In order to explore this area more deeply, an analysis of the complete published works of the International Journal of Home Economics was conducted. Specifically, the study was interested to determine if home economics worked in the domain associated with setting expectations that would enhance the opportunity for achieving happiness. Whilst there was little explicit evidence that expectations and happiness were understood or theorised in the literature, there is a clear connection between needs, wellbeing, happiness, and sustainable practices.

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Developmental Changes in Sleep Schedule: Influences of Mother's Time Use

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Abstract

This study shows the developmental changes of Japanese children in sleep schedules from 0 to 15 years of age, focusing on the influences of their mothers' time use.

Data used for this study were derived from a web questionnaire survey conducted in September 2013. The sample consisted of women having a husband and children (under 15 years old), who reside in the Tokyo metropolitan area. The valid sample size excluding quite short time responses and/or inappropriate answers was 502.

The average bedtime for 0-9 years old was between 9:00 and 9:30 p.m., a shift later from 10 years ago. The sleep schedules of children with employed mothers were significantly later than non-employed mothers for the ages 0 to 12. However, sleep schedules did not show a linear correlation with mothers' working hours. Logistic regression analysis with a subsample limited to 0-12 years old (n=233) tested the factors affecting late bedtimes. The result showed that whereas a later return home by mothers and having support from grandparents increased the probability of late bedtimes while fathers' childcare and co-residence with grandparents decreased the probability.

To prevent late bedtimes, it is important that mothers return home earlier and fathers handle more childcare. Receiving support from grandparents has a double-edged effect: support from non-resident grandparents is more likely associated with late bedtimes. This study speaks to the need for a fundamental change in Japanese full-time employee work schedules so as to retrieve a sound life for children.

Background: Young Children's Delayed Sleep Schedule

In Japan, it had been reported these past 10 years that young Japanese children's sleep schedule is markedly late. Eithoh et. al (2011) shows the rate of change with a Japanese national sample of preschool children who go to bed later than 10 p.m. It is remarkable that 59% in 2000 and 41% in 1990 of 2-years-old go to bed later than 10 p.m. Especially in 2000, the tendency of the late bedtime is quite marked showing more than half of pre-schoolers go to bed after 10 p.m.

In data compared with other countries, Asian countries, especially Japan and Korea show a marked shortness of sleep and late bedtimes for children (Mindell et. al, 2010). Apart from Japan and South Korea, the average bedtime for 0- to 36-month-olds was in the 20:00 hour time span. Japan's average of 21:18 and even more so South Korea's of 22:06 showed a

significant trend for late bedtimes. Nor was it the case that these late bedtimes were covered by naps during the day. The total sleep time per day for Japanese infants was the shortest of the eight countries surveyed, more than one hour shorter than compared to Western countries.

In research on sleep and behavioral disorders in children, it has been pointed out that disturbed lifestyles in early childhood such as late sleeping easily lead to behavioral problems and emotional instability (Kodama et. al, 2011, Nixson et. al, 2008, Gregory et. al, 2008, Yokomaku et. al, 2008). There is also research that a higher percentage of 5-year-olds with disturbed sleep-wake rhythms can not replicate a triangle correctly compared to 5-year-olds with good sleep-wake rhythms, raising concern also about adverse effects on brain development (Suzuki et. al, 2005). It has also been confirmed empirically that Japanese elementary and junior high school students with regular bedtimes and who eat breakfast every day do better on achievement tests, the importance of sufficient sleep and a well-ordered life in children's development has long been pointed out (MEXT, 2012).

Factors determining children's bedtimes

Children's bedtimes and length of sleep are said to be affected not only by personal factors such as the individual's temperament, but also to a large degree by environmental factors. What then are the environmental factors directly affected by adult attitudes and behavior surrounding both children and parents? Kodama et. al (2009) cite that parents' attitudes to sleep and their putting children to bed behavior have an influence on children's bedtime schedules. When parents are aware of the importance of an early bedtime and put their children to bed at an appropriate time, children will not be late to bed (Magee et. al, 2012).

However, if the mother is working, her time is limited after returning home, and it is not easy to put children to bed at an appropriate time. Especially in the case of mothers who work full-time, it is very difficult to return home early (Statistics Japan, 2012). In addition to the significant trend for full-time workers in Japan to work long hours, in many cases a considerable commute time is required when living in the Tokyo metropolitan area (Nagase & Moriizumi, 2011). Moreover, given the low participation of males in housework and childcare, women are responsible for the majority of housework even if they work and they have many tasks to perform after they return home (Statistics Japan, 2012, Inui, 2013). The share of three-generation households has also fallen in recent years, suggesting that only a low number of cases receive help with housework and childcare from grandparents (Koyama, 2012). While the employment rate for women with preschoolers has risen, if there is no change in the trend for long work hours and women being solely responsible for housework, it is more than likely to have an adverse affect on children's bedtimes.

Based on the above situational awareness, this study will examine how the everyday life circumstances of parent influence a child's bedtime. In addition to checking developmental changes in children's bedtime and length of sleep from data on 0-15-year-olds in the metropolitan area, it will also clarify how the everyday life circumstance of parents' impact on children's lifestyles using children's late bedtimes as a representative index.

Method

Sample

Table 1 Data Set Outline

Survey Type	Cross section survey
Survey Subjects	Married women with children (under 15 years) reside in Tokyo metropolitan area
Sampling	Stratified random sampling (based on job status and the age of the smallest child) from registered monitors of a internet research company
Survey Method	Web Questionnaire Survey
Survey Period	September 20-25, 2013
Valid sample size(rate)	502 (30.2%)
No. e-mail sent	1,660
Used Subsample for logistic Regression	276 (first child aged 15 years and under)

Data used for this study derive from a web questionnaire survey conducted in September 2013 on a sample of married women and children (under 15 years old), who reside in the Tokyo metropolitan area. The data set used is shown in Table1. Stratified random sampling based on job status and the age of the smallest child was conducted from the registered monitors of an online research company. The valid sample size excluding quite short time response or inappropriate answers was 502, 301 employed and 201 non-employed.

The dependent variable: Late Bedtime

The dependent variable “late bedtime” is 1 and “others” the 0 dummy variable. Of the items asked concerning the daily time schedule, those who gave 10.p.m. or later as the bedtime for the eldest child were treated as “late bedtime”.

Explanatory Variables

Explanatory variables included (1) mothers’ returning home late (dummy variables with “6 p.m. and after” is 1, if not, 0), (2) fathers’ returning home late (dummy variables with “8 p.m. and after” is 1, if not, 0), (3) fathers’ involvement in childcare (aggregated scale of Likert-type 4 degree with 7 items, $\alpha=.785$), (4) grandparents childcare support (“more than once a month” is 1, if not, 0), and (5) living with grandparents (“yes” is 1, if not, 0). Control variables are child-related factors including (1) child age (10 years old and over = 1, if not, 0) and (2) the number of siblings. Since the analysis focuses on the bedtime of the eldest child, a number of siblings of 2 or more indicates that the child has younger siblings.

Results

Children’s bed time and Mother’s Work hours

First the developmental changes of children’s bedtime and the difference in their bedtime by their mothers’ work hours will be examined. Figure 1.1 shows the mean bedtime across age group by mother’s work hours.

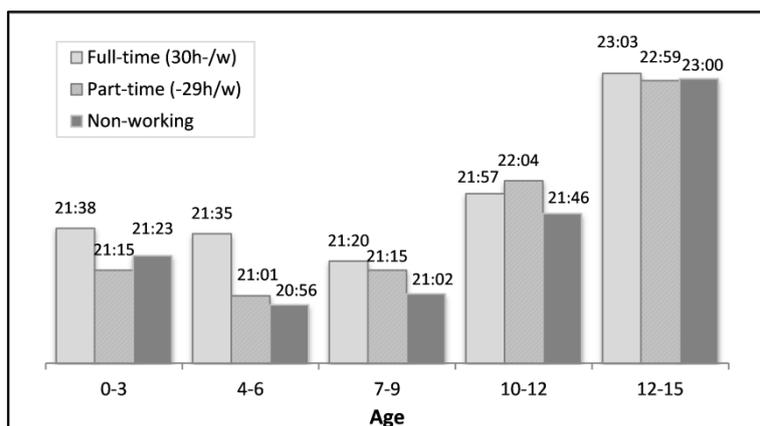


Figure 1 Bedtime across age group by mother's work hours

Looking at averages, the bedtime of children aged up until 9 stayed around the 9:00 to 9:30 p.m. mark, becoming later for children aged 10 years and upward. As with the results of nationwide sample data (Eitoh 2011), the bedtime for 0- to 3-year-olds was later than 4- to 6- and 7- to 9-year-olds. The major causes of a later bedtime for 0- to 3-year-olds were that there are a lot of children who have a nap time and can sleep until late in the morning because they have not yet started a social life such as going kindergarten or school.

Table 2 Weekday time schedule by mother's work hours

	Wake up	Return home	Start dinner	Bedtime (children)	Bedtime (mothers)	Late bedtime rate
Full-time: 30h and more/w	5:54	17:59	19:05	21:40	23:09	43.2%
Part-time: less than 30h/w	6:13	15:44	18:41	21:32	23:18	39.8%
Non-Working	6:18	—	18:35	21:16	23:26	25.7%

Figure 1 indicates that children's bedtime did differ according to the mothers' work hours, the bedtime for children of full-time working mothers (working 30 hours and more per week) being the latest for 0- to 9-year-olds. Especially for 4- to 6-year-olds, children's bedtime varies greatly according to the mother's work hours by more than 30 minutes. While the average bedtime for 4- to 6-year-olds with full-time working mothers was 9:35 p.m., that for part-time working mothers was 9:01 p.m. and for non-working mothers 8:56 p.m. However, the bedtime difference for very young ages gradually decreased, the difference by mothers' workhours becoming hardly identifiable.

Mothers' time schedule: children under 12 years

Focusing on children under 12 years, the mothers' average daily timetable was checked to see how they managed their time on weekdays. Table 2 gives the averages for weekday time schedules by mother's work hours. As can be seen, the mothers' average timetable showed a tendency according to their work hours. "Start dinner" and "Bedtime" became later corresponding to the length of the mothers' working hours, in the order of "Non-working", "Part-time", and then "Full-time". The average bedtime of the eldest child was 9:16 p.m. for non-working mothers, 9:32 p.m. for part-time mothers, and 9:40 p.m. for full-time mothers.

The numbers on the right side of Table 2 show the ratio of the eldest child's Late Bedtime, i.e. after 10 p.m. As noted before, the ratio of Late Bedtime for "Full-time" mothers was the highest at 43.2%. The ratio for "Part-time" mothers was 39.8%, which did not differ greatly from "Full-time" mothers. That of "Non-working" mothers' was the lowest at 25.7%. However, the result shows the ratio of their child's Late Bedtime to be over 25%.

At the same time, the timetable revealed the busy daily life of full-time mothers. They had only 1 hour or so from "Return home" to "Start dinner". Although the average child's bedtime for full-time mothers was the latest, the difference with that of part-time mothers remained 9 minutes. The picture is one of mothers moving from one task to the next from the time they return home until their child's bedtime as they try to get their children to bed early.

Factors affecting late bedtime: Logistic regression:

Table 3 presents the minimum, maximum standard deviation and mean for each variable used in the analysis for the total sample. The mean is also calculated by bedtime and the t-test is used to test the significance of difference between late (10 p.m. and later) and not late (before 10 p.m.).

The proportion of children going to bed late at 10 pm or after was 35% of the total. The share of mothers returning home after 6 pm was 14% overall, 21% in the case of a child going to be late, and 11% if not, the percentage of mothers who return home late being statistically significant for late bedtimes or not. The share of fathers returning home after 8 pm was 60% overall with the average father child care participation score being 13.8, meaning he would perform the seven items listed about 2-3 times per week. Although the percentage that receives parenting support, such as a drop off and pick up by grandparents, at least once a month is not low at 39%, the percentage of those living with grandparents is a minority at 7%. There was no statistical significance in whether a child went to bed late or not for the father's return home time, his childcare participation, grandparents' parenting support, or the proportion living with grandparents. The variable that showed a large difference for late bedtimes or not was the age of the child him/herself. While 56% going to bed after 22:00 were 10-12-year-olds, the figure for the second highest cohort of 9-year-olds was 19%.

The most pronounced finding in this descriptive table is that the significant different variables between late bedtimes and not late were 1) late return home: mother, and 2) 10-12 years old: age of the eldest child. With respect to parents' and grandparents' factors, mean differences by children's bedtime were not significant other than the mothers' return home.

To identify factors affecting children's late bedtime other than mothers' work hours and controlling for reciprocal influence, logistic regression analysis with Late-bedtime as the dependent variable was conducted.

Table 3 Descriptive Statistics

Dependent Variable		Min.	Max.	SD	Mean		
					All	Bedtime	
						Late (22:00 and later)	Not late (before 22:00)
Late bedtime		0	1	.48	.35		
Parents' and Grandparents' Factors	Late return home (18:00 and later): mother	0	1	.35	.14	.21	.11 *
	Late return home (20:00 and later): father	0	1	.49	.60	.58	.62
	Father's childcare	7	28	4.38	13.80	13.30	14.06
	Childcare support by grandparents	0	1	.49	.39	.45	.36
	Living with grandparents	0	1	.25	.07	.05	.07
Control Variables	10-12 years old: age of eldest child	0	1	.47	.32	.56	.19 ***
	The number of siblings	1	4	.65	1.57	1.57	1.58

*:p<.05, ***:p<.001(T-tests)

Table 4 shows the result of logistic regression analysis for the sample of 12 years and under that explores factors affecting late bedtime, 10 p.m. and later. The proposed model yielded a chi-square of 57.454 with 7 degrees of freedom, showing that this analytical model fits the data reasonably well.

As a result of the analysis, there was a 2.27 times higher prospective that a child at elementary school would sleep late if, "mother's return home: 18:00 and later" compared to 18:00 or earlier. Elsewhere, "grandparents parenting support" as a factor leading to late sleep was 1.95 times higher and significant at the 5% level compared to no support no support. In contrast, "childcare frequency of husband" at 0.94 times, and "living with grandparents" at 0.32 times were both under the value of 1, and although they are factors in reducing the probability of late sleep, their statistical significance was only at the 10% level. The factor "husband returns home at 20:00 or later" was also negative, and although it is a factor reducing the probability of late sleep, the level was not statistically significant. Checking the control variable, if the eldest child is 10-12 years old the probability was 6.13 times compared to those under 10 years old, making it the most powerful explanatory variable. While "number of siblings" was negative, it was not statistically significant.

Table 4 Factors affecting late bedtime of children: Logistic regression

		B		SE B	Odds
Parents' and Grandparents' Factors	Late return home: mother	.819	*	.382	2.269
	Late return home: father	-.428		.295	.652
	Father's childcare	-.063	+	.034	.938
	Childcare support by grandparents	.668	*	.287	1.951
	Living with grandparents	-1.134	+	.639	.322
Control Variables	10-12 years old: eldest child age	1.813	***	.293	6.129
	Number of siblings	-.268		.218	.765
Constant		-.091			
x2					57.454***
df					7

*:p<.05, ***:p<.001

Discussion

It was confirmed in this study how children's sleep schedules were affected by adult work status and time use surrounding the child, such as parents. Children's bedtimes were shown to vary according to the mother's employment status, bedtimes being the latest for 0- 9-year-olds if the mother worked full-time. However, the differences observed when children were small gradually decreased, with differences by employment status of the mother being hardly observable for 12-year-olds and over. This would suggest that at the age of 12 and over, children set their own life schedules without being affected by parent putting-to-bed behavior and pace of life.

Furthermore, in Japan, if the mother is in full-time employment, it is not uncommon until a child is six years old to take a nap in childcare facilities, and so going to be a little late at night is not necessarily considered to be a hindrance to daily life. Considering these in conjunction, attention need to be paid to differences in children's bedtimes of the child by the mother employment status during the ages 6 to 12 years, in other words the elementary school years. Not only is adequate sleep required during the elementary school years, children are still easily affected by their parents life schedules at this age. Especially in the early stages of elementary school, children must learn to get adequate sleep while breaking the nap pattern. The involvement of parents is key in keeping a rhythm of early bedtime.

Regarding grandparents, it was a surprising result to find that children went to bed later if "there is child care support from grandparents" than not. Taken together with the fact that "living with grandparents " lowers the probability of late sleep, it may be that rather than living with grandparents, support from grandparents who live close by in the form of dropping children off and picking them up leads to later bedtimes. Relying on childcare from grandparents may lead to a tendency for the mother to return later, or to waste time going home from the grandparents', thereby delaying bedtime. In addition, it may also be that in the first place the mother is so busy that she has to get help from the grandparents and she may not have the physical or temporal leeway to put children to bed early.

A point revealed by multivariate analysis was that in order to prevent late bedtimes for children, an early return home by the mother and childcare participation by the father were important. Although nothing would be better than an early return home by the father as well, at the current stage what is in question is his actual involvement in childcare rather than time. Regarding grandparents, while it is favorable to live together, relying on grandparents who live somewhere else has the apparent drawback of making children's life schedules later.

Today the employment of women is promoted and there is a call for men and women to be able to work equally, but this should not come at the cost of children's lives. In order to maintain a healthy life for the child, initiatives such as parents being able to return home as a matter of course by 18:00 are crucial.

Biography

Yuka Sakamoto, Ph.D. (Social Sciences) is associate professor of Family and Consumer Sciences at the Graduate School of Natural and Living Sciences Education in Naruto University of Education, Japan. Her main areas of expertise include alternative work arrangement and work-family life, female labor participation, children's lifestyle and consumer studies. She has directed three family lifestyle research projects funded by Japan Society for the Promotion of Science. She has an extensive experience in working in both quantitative and qualitative research projects and especially well-accustomed with quantitative research methods, study design and statistical data analysis. E-mail: ysakamoto@naruto-u.ac.jp

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Sustainable Food Purchasing Behavior of Consumers in Singapore

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Abstract

This primary aim of this study was to examine the perception and behavior towards the purchase of sustainably-produced food of consumers in Singapore. Almost 900 working adults in Singapore completed a survey which included a food choice ranking, a values clarification exercise, likelihood to buy environmentally-friendly items and a knowledge quiz. Results showed consumers were consistent in the way they prized their beliefs regarding food choice and the way they choose and purchase food. The main drivers for food purchase are pragmatic reasons such as “safety”, “health”, “personal preference” and “affordability”. Few (<10% of consumers) prioritized environmental and ethical concerns when making food choices. Consumers were uncertain that purchasing sustainable food would make a difference towards environment conservation (54.3%) and 76.6% made little effort to buy sustainable food. Knowledge was generally weak and did not correlate to the intention to purchase environmentally-friendly goods. However, consumers who worked in environmental-related occupations considered the environment and ethics when making food choices more than those who are not in environment-related work, and were more likely, though not significantly different, to buy products made from environmentally-friendly material and believed that buying sustainable food would make a difference in conservation. This result indicated that contrary to popular belief that knowledge increases the intention to be more sustainable in food purchase, it is the level of engagement in conservation work that will motivate sustainable behavior. Hence it is crucial to not just translate sustainable literacy but engaging the consumers in caring for the environmental to change behavior.

Introduction

“Sustainable living, sustainable consumption, green, eco-friendly, environmental conservation”, are trendy words tagged loosely to everyday living these days. However, in recent years, these phrases seem to have gained more presence in our daily lives than before. For example, they can be found on labels of products, services, commercials, and are formally discussed in government initiatives and policies. With greater awareness, there is also greater pressure, direct or indirect, to promote sustainable living. While there is no exact definition of the term *sustainable consumption*, a formalized definition was proposed at the Oslo Roundtable on Sustainable Production and Consumption Symposium 1994. The Oslo symposium defined sustainable consumption as the usage of goods and services to satisfy the basic needs of humans and to improve the quality of life, “while minimizing the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not

to jeopardize the needs of future generations” (Norwegian Ministry of Environment, 1994). In simpler terms, sustainable living means that consumers need to factor in “sustainability” in their decision-making process, in order to reduce negative impact on the environment.

This research focused on sustainable food consumption, in particular, to measure the perception and understanding of sustainable food consumption of consumers in Singapore. Sustainable food consumption is one of the approaches to ensure sustainable living. While there are no official definitions to date, sustainable food consumption generally encompasses aspects of sustainable food production, human and animal health, effects on the environment, fair trade, fair wage, reduce carbon footprint, minimizing waste, as well as food security and availability. Sustainable food consumption can be regarded as “access and use by all present and future generations to the food necessary for an active, healthy life, through means that are economically, socially and environmentally sustainable” (Lefin, 2008, p.2). Tischner and Kjaernes (2007) stressed that sustainable food consumption is not about reducing food intake per se but to consider food production, preparation, consumption, digestion and disposal of leftovers in the context of different regions and cultures. Sustainable practices must be incorporated throughout the food supply chain, literally at each critical stage from farm to fork to bin. Particularly, systems must be in place in this process to mitigate potential negative environmental consequences.

The world’s growing population coupled with globalization has also brought about greater mobility of people. Consumers are demanding for easy access to international food. As people move, the demand for their traditional and cultural flavor in food also increases through assimilation and acculturation of food in these plural or multi-cultural societies. This has resulted in rising energy usage to transport food to various parts of the world. Research conducted by the European Environment Agency (EEA) showed that within Europe, food consumption is one of the four major components which directly impacts the environment, alongside housing, personal travel and tourism (EEA, 2006).

Singapore is a highly urbanized island city, with more than 5 million people living on an area of about 712 km² and lacking in natural endowments of large countries. Population stress, coupled with almost no food production, places Singapore in a precarious position in terms of food sustainability and security. Food production is insufficient and unsustainable. Singapore imports 90% of food and 40% of water. This means that the nation is highly sensitive to food prices and supply fluctuation as imports can be hindered by natural disasters, epidemics, or transportation hitches.

Factors influencing sustainable food consumption

Research has shown that the factors that influence their food purchases are governed by “self-centered” values such as economic considerations, health concerns, taste, appearance, nutrition, availability, familiarity and ethical concern (Hoogland, de Boer, & Boersema, 2006; Steptoe, Pollard, & Wardle, 1995). More than 60% of the 520 American consumer surveyed agreed that they would consider buying if sustainable products were safer, healthier, higher quality and same price (Grail Research, 2009). However, the idea of considering the environment when making purchases does not seem to be explicit among consumers. Self-centeredness hinders the willingness to consume sustainably while eco-friendly attitudes,

concern for human rights and welfare promote sustainable consumption (Eurobarometer, 2009; Paavola, 2001; Wheale & Hinton, 2007).

While consumers may have a positive intention to buy products with special attributes, this good intention may be negated by economic considerations. Economic constraint is a pragmatic consideration when it comes to food purchase. Without sufficient income, people's choices of food are limited. Studies have shown that consumers assumed that sustainably-produced food were more expensive and would avoid buying them (Hoogland et al., 2006; MA 2002; Strack & Deutsch, 2004; Tonsor & Shupp, 2009). However, some studies reported the opposite where consumers were willing to pay more for environmentally-friendly products (Eurobarometer, 2008; Globe Scan, 2012; McCluskey & Loureiro, 2003; Teisl, Roe, & Levy, 1999).

In order to be convicted to consume sustainably, consumers ought to have a fair knowledge of the benefits of sustainable food consumption. However, this topic seemed to require certain level of cognitive effort and research to understand (Biel & Dahlstrand, 2005; Wheale & Hinton, 2007; Young, Hwang, McDonald & Oates, 2010). Past studies on sustainability knowledge indicated that consumers' knowledge in this area is fragmented and superficial (Grail Research, 2009; Tonsor and Shupp, 2009). The review by Tan (2011) on past studies suggested that an increase level of environment knowledge had a positive impact on environmental attitude and more concern on the environment.

In terms of demography, older consumers seemed to be more willing to practice sustainability and/or purchase sustainable goods (Vermir & Verbeke, 2004). Likewise, education and income level were significant factors that influenced the purchase of green food (Teng, Rezai, Mohamed, & Shamsudin, 2011; Tonsor & Shupp, 2009; Zhu, Li, Geng & Qi, 2013).

The aim of this study was to examine the attitudes and food purchasing behavior of Singapore consumers in the context of sustainable living. The factors that determined food choice, the knowledge on sustainability and the likelihood to buy sustainable food were measured.

Methods and Materials

Sample

A self-administered survey was given to more than 1000 working consumers in Singapore. A total of 831 valid responses were collected. The sample comprised of subject aged 18 to 80 years old. Ratio of females to males is 1.69. The racial distribution of this sample was similar to the Singapore population (SingStat, 2013). The education level of this sample was higher than the national population, with 11% more university graduates. Ethics approval to conduct the study was obtained from the Nanyang Technological University Institutional Review Board, Ref No. IRB-2012-10-044.

Ranking of determinants of food choice

The factors were adapted from the food choice questionnaire (Steptoe et al., 1995). Consumers had to rank the importance of the following 10 factors: (1) Group Acceptance, (2)

Environment, (3) Ethically-produced (human rights, animal rights), (4) Convenience/ Availability, (5) Financial Security, (6) Health, (7) Personal Preference, (8) Religion, (9) Safe to Eat, and (10) Preference of Family and Friends, “1” being the most important and “10” being the least important.

Knowledge on sustainability quiz

Perceived knowledge was measured by asking consumers to rate how much they well they thought they know about sustainability and sustainable food consumption. Actual (measured) knowledge was determined by a 9-item multiple choice questions quiz. Items were adapted from several generic consumer quizzes on sustainability (BBCNews, 2007; Clutterbuck, n.d; Dolceta, 2011; National Geographic, n.d). Each item consists of one key alternative and three distractors. The quiz tests the consumers on their knowledge of the process of sustainable food production and purchase, i.e., from farm to table.

The questions were (maximum score for the quiz was 9 points):

1. Who are the biggest carbon dioxide emitters in farming?
2. Consider seafood sustainability, which of the following would you choose?
3. Which of the following is the most sustainable way of storing leftover food?
4. Which of the following certifications can help small farmers earn a higher share of profit?
5. Which of the following is considered a sustainable purchase for Singapore consumers?
6. Which of the following measures the amount of greenhouse gas emissions caused by an organization, event, product or person?
7. Which of these is not a sustainable practice in food processing?
8. Which of the following takes the shortest time to break down, i.e., most biodegradable?
9. Which is the most sustainable dish?

Likelihood to buy sustainable food scale

Consumers were asked (a) if they would buy environmentally-friendly food over conventional food. Additional condition such as if the food (b) cost 10% and (c) 20% more, if they needed to (d) travel 15 minutes or (e) 30 minutes further to get the food, (f) if the food was packed in environmentally-friendly material, if such environmentally-friendly packaging (g) cost 10% more and (h) cost 20% more, (i) even if their friends and relatives did not use them, (j) if it received a “green-certification”, (k) if it contributed less greenhouse gas emission and (l) if it was made by a socially-responsible company, assumed *ceteris paribus*. The Cronbach’s alpha

of this eight-item scale was .90, hence, confirmed that the scale was statistically reliable. Items that did not incur additional cost or inconvenience to consumers (items a, f, j, k and l) were loaded on the factor "Likelihood to Buy" (48.92% of the variance), where the remaining items were loaded on the factor "Likelihood to Buy with additional clause" (15.65% of the variance). The likelihood to buy sustainable food were analyzed in term of age, qualification level, income level, as well as their involvement in environmental conservation in terms of their occupation.

Results and Discussion

Determinants of food choice

Reasons for the determinants of food choice were categorized into two groups: pragmatic reasons and socio-psychological reasons. Pragmatic reasons included safety, health, price, convenience. Socio-psychological reasons refer to factors such as endorsement from family and friends, being part of the group (acceptance), environmentally and ethical consciousness, religion and personal preference.

The factors of considerations that were ranked in first, second or third positions when choosing food were "safety" ($n = 516$, 62.4%), "personal preference" ($n = 459$, 55.5%) and health ($n = 405$, 49.7%) (see Table 1). This concurred with past research that consumers would generally choose food based on "self-centered" reasons, such as health, price and quality (Hoogland et al., 2006; Steptoe et al. 1995). Hence, decision making are directed by personal capacities and preference.

Environmentally-related reasons were not important considerations when choosing food, with only 8.7% ($n = 72$) of consumers ranking this factor as the top first, second or third reasons for consumption (Table 1). Although eco-friendliness, human rights and welfare are the underlining values for the purchase of sustainable food, such altruistic values are not given priority considerations when choosing food (Eurobarometer, 2009; Paavola, 2001; Whale and Hinton, 2007). The results of this study indicated an urgent need to raise the level of awareness of environmental issues among the consumers, so that consumers will place sustainability as a priority when making food choice.

In the values clarification exercise, the tens values were paired up into all the possible permutations and consumers were asked to choose one out of two values that they considered more important. The results showed that personal preference (>50% of consumers selected) was chosen over all other factors, even safety (49.9%), health (48.1%) and affordability (47.2%). Ethics (51.3%) and religion (51.4%) were valued as more important than environment by the consumers. With reference to Table 1, religion was ranked quite highly and consumers valued religion as more important than ethics (48.6%) and group acceptance (40.2%).

Table 1 Rank position of the factors of consideration that are important to consumers when making food choices ($N = 831$)

Rank position					
As 1st, 2nd or 3rd			As 1st		
Factors	<i>n</i>	%	Factors	<i>n</i>	%
Safe to eat	516	62.4	Safe to eat	237	28.7
Personal preference	459	55.5	Religion	185	22.4
Health	405	49.7	Personal preference	168	20.3
Financial Security	322	39.0	Health	136	16.4
Convenience	293	35.4	Financial Security	73	8.8
Religion	248	30.0	Convenience	65	7.9
Family/friend preference	177	21.4	Family/friend preference	28	3.4
Ethically-produced	80	9.7	Environment	24	2.9
Environment	72	8.7	Group Acceptance	20	2.4
Group Acceptance	62	7.5	Ethically-produced	14	1.7

Note: 1 = most important, 10 = least important

Perceived and Measured knowledge

Generally, consumers felt that they knew a little about sustainable food consumption (Figure 1). Out of 287 consumers, two-thirds of them ($n = 568, 68.6\%$), felt that they knew nothing or a little about sustainable food.

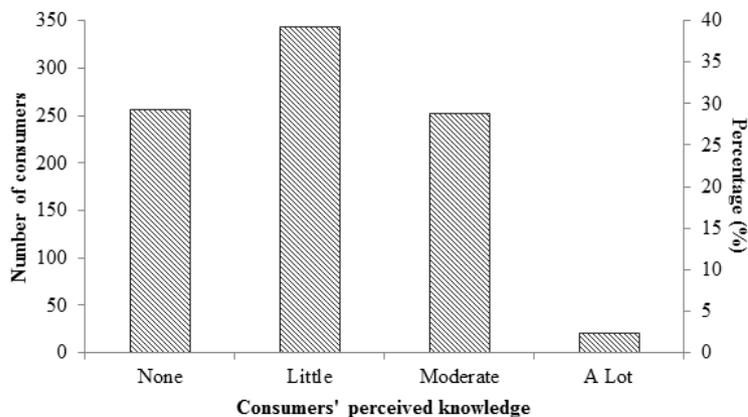


Figure 1 Number and percentages of consumers in the four categories of perceived knowledge of sustainable food ($n = 831$).

In terms of measured or actual knowledge of sustainability and sustainable food consumption, most consumers were able to answer five out of nine items (Mode = 5). Cumulatively, 90.1% of the consumers could answer six items or less correctly in the quiz section of the questionnaire ($M = 4.44, SD = 1.69, n = 749$). The poor results could be that Singapore is not an agrarian-based society and most of the foods available in Singapore were imported, therefore consumers were not knowledgeable about agricultural processes and production. Another reason could be that the topic on sustainable food production does not receive sufficient media attention.

In another item, consumers were asked if they had heard of a list of programs that promote food sustainability. Again, most consumers indicated they knew only four out of the seven programs. Local programs such as “Green label”, “Stop the sales of shark fin products at Singapore supermarket” and “Bring your own bag” were more well-known among the consumers. These programs are advertised in the media as well as in taught in the home economics syllabus in Singapore schools. On the other hand, international programs such as the “UN Millennium Goals” and “WWF Sustainable Fish Guide” were less familiar to consumers. This reinforced the importance of publicity promotion through mass media to the public and through the school curriculum.

Perceived knowledge versus measured knowledge

Perceived knowledge of sustainable food consumption did correlate significantly to measured knowledge of sustainable food consumption ($M = 1.97$, $p = .00$), i.e., consumers who thought that they knew a lot about sustainable food consumption seemed to have a better measured knowledge score (Figure 2). This is a good sign as people often claimed to be familiar in a topic did not necessarily understand the topic (Alba & Hutchinson, 2000). However, the results indicated that consumers who ranked environmental-friendliness as the top three most important considerations ($n = 72$) neither perceived they had more knowledge nor had better quiz score than those who didn’t consider the environment as their top priority when choosing food. This results indicate that knowledge on sustainability need not necessary translate to actual concern for the environment.

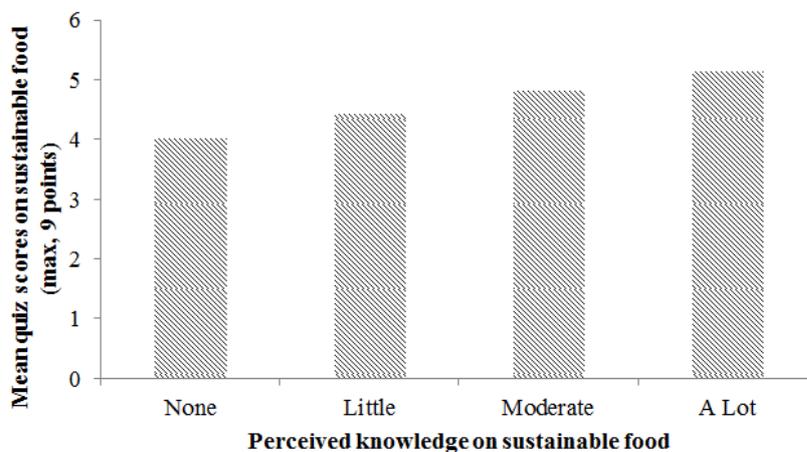


Figure 2 Mean of measured knowledge (quiz scores) at the four levels of perceived of perceived knowledge on sustainable food consumption ($N = 828$). There is a statistically significant correlation between perceived and measured knowledge ($r = 1.97$, $p = .00$).

Likelihood to buy sustainable food

Results indicated consumers were likely to buy sustainable food (or environmentally-friendly food) as the mean score on the likelihood to buy was 3.45 ($SD = 1.02$), out of a maximum scores of 5. Analysis of individual items showed that consumers were more likely to buy sustainable food for “social awareness factors” such as buying product in recycled packaging

($M = 3.45$, $SD = 1.06$), less greenhouse gas emission ($M = 3.36$, $SD = 1.04$), with green certification ($M = 3.34$, $SD = 1.01$) and made by socially-responsible company ($M = 3.52$, $SD = 0.98$). However, results showed that consumers were not likely to buy if they had to give up some economic benefits, such as paying 10% more ($M = 2.83$, neutral was 3, $SD = 1.05$), paying 20% more ($M = 2.26$, $SD = 1.05$), or give up some convenience, e.g., travel 15 minutes farther to get sustainably produced food ($M = 2.50$, $SD = 1.13$); travel 30 minutes farther ($M = 2.00$, $SD = 1.07$). These results concurred with past studies which showed that consumers would hesitate to buy sustainable food if they were more expensive (Tonsor & Shupp, 2009; Hoogland et al., 2006; MA, 2002). However, consumers were uncertain that purchasing sustainable food would make a difference towards environment conservation (54.3%). Most of the consumers stated that they made little effort (76.6%) to buy sustainable food. This concurred with the results from the items where consumers ranked safety and personal preference, price and health as priorities, and environmental-friendly and ethically-produced were among their least concern.

Demographics differences and the likelihood to buy sustainable food

Further analysis of the data by demographic differences indicated that older consumers were significantly more likely to purchase sustainable products than younger consumers ($r(782) = .08$, $p = .03$). Likewise, consumers who were more educated (high qualification attainment) were more likely to purchase sustainable goods ($r(800) = .08$, $p = .03$). In addition, age and qualification were positively correlated to income level ($r(593) = .46$, $p = .01$ respectively). Refer to Table 2 for details on the inter-correlations for the various factors. Further ANOVA and post-hoc LSD analysis showed that consumers with no formal education ($M = 2.43$, $SD = 1.13$) and those with technical certification ($M = 2.88$, $SD = 0.93$) were significantly less likely to purchase sustainable products ($F(7, 794) = 3.16$, $p = .00$). The results in this study supported past findings that the higher the education qualifications, the more likely the consumers would buy green products (Grail Research, 2009; Teng et al., 2011; Tonsor & Shupp 2009; Zhu et al., 2013).

Table 2 Inter-correlations among likelihood to buy sustainable food, perceived knowledge, measured knowledge, age, qualification and income levels

	1	2	3	4	5	6
1. Likelihood to buy	–	.06	.01	.08*	.08*	.06
2. Perceived knowledge		–	.20**	.03	.13**	.05
3. Measured knowledge			–	-.04	.26**	.05
4. Age				–	.02	.46**
5. Qualification					–	.46**
6. Income						–

* $p < .05$, ** $p < .01$

Interestingly, consumers who ranked environmental-friendliness as the top three most important considerations ($n = 72$) were significantly more likely to purchase sustainable food than the rest ($t(814) = 2.43$, $p = .02$). Consumers were significantly more likely to pay more for sustainable food products that cost 10-20% more and/or travel 15-30 minutes further to

get such food. This meant that consumers who cared enough would actually carry out their actions to show their support.

Consumers who worked in areas related to environment conservation ($M = 3.78$, $SD = 0.87$) were more likely, though not significantly, to buy sustainable good than those who worked is not related to environment conservation ($M = 3.44$, $SD = 1.01$). This indicated that being involved in conservation work increased the consciousness towards being more sustainable.

Conclusions and future research

The study provided an insight into understanding of food choice - the determinants of food choice, the knowledge on sustainable food consumption, as well as the likelihood to buy sustainable food and change of behaviors towards a more sustainable lifestyle. The results showed that consumers were willing to buy and live more sustainably if the actions taken would not incur economic cost or cause more inconvenience. "Knowledge" and "personal capacity - educational level and income" have an impact in their likelihood to buy sustainable food and likelihood to change behaviors towards more sustainably living.

The results also showed that the measured knowledge of the consumers scored poorly for the quiz on sustainability, especially on sustainable food consumption. Perhaps the poor understanding on sustainability affected the relationship with perceived knowledge. Nevertheless, it is still strongly believed that when the consumers gained sufficient knowledge on sustainable food consumption, their perceived knowledge would be higher as well.

This survey has some limitations. Attitude and behavior cannot be fully comprehended by a few questions survey. Research should be conducted to examine outstanding issues. For example, the values underpinning purchases need to be determined to understand the decision-making process in purchasing sustainable food. Empirical data on actual purchase of sustainable food products should be collected as well to determine if values are translated into actions.

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Acceptability of potato-based vegetable chips for children

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Abstract

To increase children's preference for and consumption of vegetables, potato based vegetable chips were developed, using a basic choux paste. Hundred children, in the age range four to six years, participated in the study. A specially adapted five-point hedonic Smiley face scale was used. Children preferred pictures of potato chips to pictures of beetroot, green beans and carrots. For colour choice, carrot chips were significantly ($p < 0.001$) liked more than green bean and beetroot chips. For brown-type vegetables, sweet potato, butternut, butternut + sweet potato and sweet corn chips were significantly ($p < 0.001$) liked more than cauliflower and cabbage chips. The sweet potato had the highest numerical score of 4.16. Further tests performed with this chip found no significant differences in the liking of cooking method. The oven baked option was subsequently chosen for further tests, because it was the healthiest option. There were no significant differences in the liking of different oils, coatings and replacement of potato flour with chickpea flour. Population group had a significant effect on green bean ($p=0.0189$), butternut ($p=0.0018$) and cauliflower ($p=0.0218$) chip liking, while gender had a significant effect on beetroot ($p=0.0158$), butternut ($p=0.0307$) and cauliflower ($p=0.0371$) chip liking. Age had a significant effect on the liking of green bean ($p=0.0338$) and sweet potato ($p=0.0445$) chips. The interaction between gender and age had a significant effect on the liking of 50% replacement with chickpea flour in oven baked sweet potato chips ($p=0.0378$).

Introduction

In most countries in the world, children's vegetable preference and consumption are below the recommended daily allowance (RDA) (Graaf, Koenlen, Kok, & Zeinstra, 2010). According to the American Heart Association (AHA) (2014), children's RDA's range from $\frac{3}{4}$ - 1 cup for one to three year olds, 1 - $2\frac{1}{2}$ cups for four to 18 year old females, and $1\frac{1}{2}$ - 3 cups for four to 18 year old males. These portions are based on an inactive lifestyle; when physical activity increases, portion sizes will also increase. Portions must be selected out of a variety of vegetables (AHA, 2014).

Many factors play a role in children's vegetable preferences, one being socioeconomic background, which influences perceptions and eating patterns of a child; others include age and gender (Baxter, Bower & Schoroder, 2000). Children's influence on food choices increases with age (Holdert & Antonides, 1997). Parents are often not aware that children have 'likes' and 'dislikes', which will cause dietary imbalances. In general, children prefer snack foods,

such as crisps, fried potatoes, chips and fizzy drinks, meat and starchy food over vegetables and cheeses (Edelenbos & Sondergraad, 2007). It was also found that children, who watch more television, made more unhealthy food choices and often consumed more snack foods (Amboni, Fiates & Teixeira, 2008). Television viewing habits also lead to increased development in higher-fat and sugar diets (Ahrens, Barba, Buchecker, De Henauw, Eiben, Gwozdz, K..., & Reisch, 2012).

Children all over the world are exposed to fast foods. The more children become familiar with a certain food, the more a preference towards the food will develop. The average child will prefer high energy dense food, e.g. fried chips, over foods that do not have that energy content (Birch, 1992; Camps, Shimizu & Wansink, 2011).

Preference towards vegetables can be developed because of its unique texture, which is important for enjoying food. Humans have an instinct to have full control over everything they put into their mouth (Szczesniak, 2002). Because of vegetables' crunchy texture, children cannot manipulate all the textures, which lead to either a dislike or preference. Thus, preparation methods have a crucial influence on children's acceptance and could promote the eating of vegetables. For some vegetables, the raw version is better accepted than the cooked one, because of its texture and the preparation method. Raw vegetables remain crunchy and are in some cases preferred over other preparation methods (Graaf et al., 2010). Graaf et al. (2010) also mention that for children who dislike eating vegetables, the preparation method for the vegetable is more important to be accepted. Steamed and boiled vegetables were preferred over mashed, grilled, stir-fried or deep-fried vegetables. The explanation for these findings was that participants were mostly familiar with boiling as a preparation method. This emphasized the fact that familiarity plays a role in favouritism (Graaf et al., 2010).

In general, children's food choices are heavily influenced by odour and textural preferences, and to a lesser extent by visual aspects and taste preferences (Delahunty & Poelman, 2010). According to Kildegaard (1997), however, the appearance of food gives the first interest in food choice and sets an expectation for real sensory perception. Visual aspects consist of colour, background characteristics and various segmentation factors (Delahunty & Poelman, 2010), such as size and shape (Kildegaard et al., 2011). De Graaf, Doelen, Kok and Zeinstra (2007) also confirm this in regard to colour of vegetables and suggest that colour affects children's acceptance for vegetables. Coloured, small, brittle vegetables were preferred to dark, large, green vegetables. Children, seven years and younger, had to depend on colour to make a decision about the taste of a vegetable (Delahunty & Poelman, 2010).

Studies, examining children's preferences, found that fatty and sugary foods features highly among children's top ten 'like' foods. It was found that fat food preference were higher for boys than girls. This could be due to larger energy demand for boys compared to girls (Kildegaard, 1997). Peers also play an important role in influencing what children like. They will easily change their preference when they see what other children eat (Kroll & Popper, 2003). In this particular study, pictures were shown on a computer screen of peers eating healthy food, which influenced children to be more willing to like healthy food. Additionally, fat preferences were more frequent for girls in this study, while a combined preference for

sweet and fat foods was found for boys. When applying bivariate analyses, it was found that when a child was frequently exposed to fatty foods, it related to a higher preference. Researches came to the conclusion that fat flavour and sweet taste preferences in these children were directly related to the weight status of a child (Ahrens, Barba, De Henayw, Knof, Lanfer, Lissner, M..., & Veidebaum, 2011).

Fat gives a unique texture, flavour and aroma to food, resulting in a particular fat 'taste' (Almiron-Roig & Drewnowski, 2010). Furthermore, fat in food gives the ability to create textures, e.g. crispy or creamy. When foods are fried, the extreme hot temperatures expand the steam and create crispy bubbles, giving chips its unique crunch and crispness (Zhang, 2014). Fat makes food also more fresh and moist, because it binds with water molecules (Almiron-Roig & Drewnowski, 2010). Food absorbs some oil, which replaces some water that is lost during frying (Moreira, Palau & Sin, 1995).

Alternative cooking methods and ingredients for traditional deep fried chips would contribute to healthier food choices among children. Consequently, potato based vegetable chips were developed and children's acceptability of these products was determined. Firstly, children's preference for vegetables versus chips was determined in a paired comparison test, followed by hedonic scaling of a variety of potato-based vegetable chips.

Materials and Methods

The study involved 100 children (male and female) from two South African Pre-Primary Schools, between the ages of 4-6 years, and from low and medium income households. Before sensory testing, parents or guardians had to sign an informed consent form for their children's participation and provide information about any medical condition that may put the children at risk during the study.

Before the first session, posters of the chips (Figure 1) were put on the walls of the classrooms to familiarize the children with the product and to avoid neophobia. Prior to each sensory test, every child played a game using pictures of food. These games were designed to illustrate and reinforce the cognitive skill inherent in the sensory test, with the assumption that the child would transfer the skill to the test itself (Guinard, Krimmel & Sifman-Grant, 1994). All sensory tests were performed in the school's classroom, which was familiar to the children.

Nine adult student interviewers assisted the children throughout the study. The students were trained to explain the process to each child and to deal with unexpected incidents. They were instructed to record negative behaviour or complaints, if there were any. Arrangements were set up so that the children did not face any other table. Children and the interviewers remained seated throughout the test.



Figure 1 Posters to avoid neophobia

Table 1 summarizes the different sensory testing methods, which included discrimination and consumer tests. The hedonic scale for the discrimination test was a five-point scale with both faces and words (‘dislike a lot’ to ‘like a lot’), to indicate the different degrees of like/dislike (Stone & Sidel, 1993; Figure 2). Children were asked to point to their choices.

Table 1 Picture games and sensory tests.

Type of test	
Discrimination (n=100) Paired preference test	Foods pictured: French fries vs green beans French fries vs beetroot French fries vs carrots
Consumer (n=100) Hedonic scaling	Stimuli: Green bean chip vs carrot chip vs beetroot chip Carrot chip: oven fried vs deep fried vs air fried Butternut chip vs cauliflower chip vs sweet potato Sweet corn chip vs cabbage chip vs butternut + sweet potato chip Sweet potato chip with sunflower oil vs sweet potato chip with olive oil Sweet potato chip with <i>Smash Herb*</i> coating vs sweet potato chip with <i>Kellogs Crumble</i> coating Sweet potato chip + 50% chickpea flour and 50% <i>Smash*</i> vs sweet potato chip + 100% chickpea flour

* Bokomo Foods. 40 Meil Hare Road, Atlantis 7349. A Division of Pioneer Foods (PTY) LTD. Product of South Africa

Potato-based vegetable chips

The potato based chips were made by adapting a basic *choux* paste recipe (Table 2; Foods and Cookery, 1991). The cake flour was partly replaced by *Smash* (Bokomo Foods, 40 Meil Hare Road, Atlantis 7349, a division of Pioneer Foods (PTY) LTD. Product of South Africa), a type of dried potato starch, with added salt, flavouring and preservative. The water in the original recipe was replaced by a mixture of

vegetable juice and pulp, obtained after processing the desired fresh vegetable in a juice extractor [Mean Juice machine, Multi-Purpose 4 in 1 (Millex) juice extractor]. The prepared mixture was piped in long strips onto a greased baking tray, to resemble the shape of potato chips and baked in a Defy 631-T (Thermo fan) oven for 15 minutes (min.) at 180°C. These long strips were then cut into chip sizes, about 50 mm in length. Before testing, the chips were deep fried, air-fried or oven baked. All chips were prepared the day before the test and heated prior to serving.

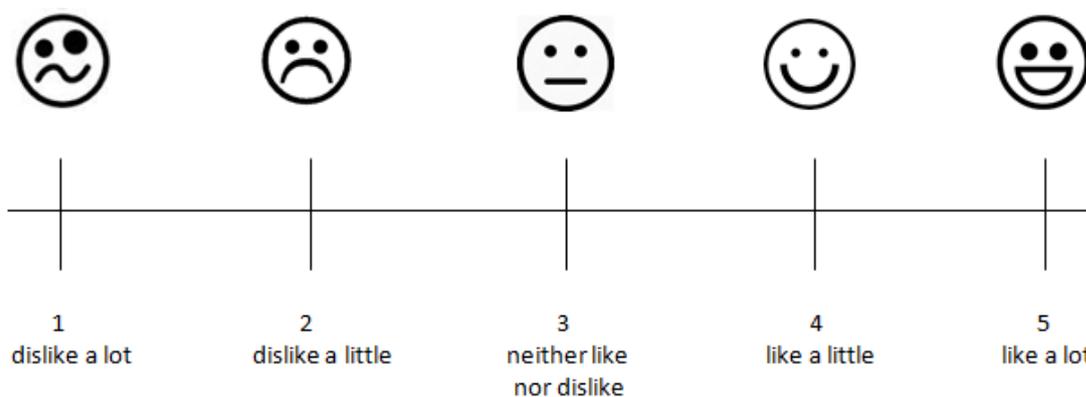


Figure 2 Five-point Smiley face scale (adapted from Stone & Sidel, 1993)

Table 2 Formulation of potato-based vegetable chips (Foods and Cookery, 1991).

Ingredient	Percentage (%)
Smash*	10.95
Butter	12.10
Egg	22.10
Vegetable pulp	21.05
Vegetable juice	26.30
Cake flour	7.40
Salt	0.10

*Bokomo Foods. 40 Meil Hare Road, Atlantis, 7349. A Division of Pioneer Foods (PTY) LTD. Product of South Africa

Table 3 summarizes the different vegetables used in the study, as well as specifications for frying/baking. Carrot, beetroot and green beans were used in the first study, to determine the influence of colour on children's preference for vegetables. The most preferred vegetable from this test, the carrot, was used to determine the preferred cooking method. Oven baking, deep fat frying and air frying were chosen as suitable methods and again, the most preferred method was used for the next studies. For the third and fourth tests, some more brownish vegetables were tested, namely butternut, sweet potato, cauliflower, sweet corn, cabbage and a combination of butternut and sweet potato. In the next test, the influence of types of oils, sprayed on the chips, was determined, using sunflower and olive oil. It was also decided to enrobe the chips, to increase the crispiness, and two very different coatings were used, namely a powdery and a crumbly one. Finally, the protein content of the chip was increased by a 50% replacement of the *Smash* with chickpea flour, as well as a 100% replacement with chickpea flour.

Table 3 Different potato-based vegetable chips used in sensory studies.

Study	Vegetables used	Specifications
Hedonic Scaling	Beetroot, carrot and green beans	Deep fat frying: sunflower oil; Kenwood 7879/1; 7 min; 200°C
Hedonic scaling	cooking method: carrot	Oven baking: 15 min; 180°C; Defy 631-T Deep fat frying: sunflower oil; Kenwood 7879/1; 7 min; 200°C Air frying: 10 min; 160°C; Philips Air Fryer
Hedonic scaling	Brownish vegetables: butternut, sweet potato, cauliflower, butternut + sweet potato, sweet corn and cabbage	Oven baked: 15 min; 180°C; Defy 631-T
Hedonic scaling	Oil: sunflower* and olive**	Oven baked: 15 min; 180°C; Defy 631-T
Hedonic scaling	Coating: <i>Smash Herb</i> *** and <i>Kellogg's Crumble</i> ****	Oven baked: 15 min; 180°C; Defy 631-T
Hedonic scaling	<i>Smash</i> replacement: <i>Nature's Choice Chickpea flour</i> *****	Oven baked: 15 min; 180°C; Defy 631-T

* Wilmar Continental, 114 Main reef Road, Randfontein, 1760, South Africa. Product of South Africa

** Aceites Borges Pont, S.A.U. Josep Trepal Avenue s/n-25300 Tarraga-Spain

*** Bokomo Foods. 40 Meil Hare Road, Atlantis 7349. A Division of Pioneer Foods (PTY) LTD. Product of South Africa

**** Kellogg's Company of South Africa (PTY) LTD, 77 Steel Road, New era, Springs, Product of South-Africa.

*****Nature's Choice. Product of India. Packed in South-Africa. 73 Cypress Avenue, Meyerton, South Africa 1960.

Statistical analysis

All the data were collected in spread sheets, using Microsoft Excel 2007 and all the statistical analyses were done using NCSS (2007). The significance of the overall acceptance measured for each sample was tested by means of analysis of variance (ANOVA). If the main effect was significant, Fisher's LSD-test was applied to determine the direction of the differences between mean values (Heymann, 1995).

After the data was calculated, the results were represented as a spider plot, where a specific spoke denotes a specific attribute. The distances of attribute mean from the centre of the plot along each spoke directly corresponds to attribute intensity. The plot provides a visual presentation of product similarities and differences (Heymann, 1995).

Results and Discussion

The demographic composition of the panel is given in Table 4. Fifty percent of the panel members were black and 50% were white. For the age split, 53% were four years old, 32% were five and 15% were six years old. Forty six percent were female and 54% were male.

Table 4 Demographic profile of child panel (n=100).

Population group	% of Total	Gender:	% of Total	Age:	% of Total
Black	50	Female	46	4	53
White	50	Male	54	5	32
				6	15

From Table 5, it was clear that there was a significant (at least $p < 0.01$) difference in the preference of vegetables versus chips for green beans, carrots and beetroot. In all cases, the potato chip picture was significantly (at least $p < 0.01$) preferred to the respective vegetable picture. When shown the picture of beetroot, there was a significant ($p < 0.01$) increase in the number of children (37) preferring this vegetable to the picture of chips. This may be due to the red colour that was either unfamiliar to the children or more appealing. Potatoes, on the other hand, are the fourth most important food in the world after wheat, rice and maize (Messer, 1994). It contains carbohydrates, vitamin B & C, fibre and folate, and has a mild taste that children easily adapt (Farm Fresh Direct, 2012).

Table 5 Paired preference analysis of child panel.

Treatment		n = 100	Significance Level
Beans/Chips	Vegetables vs Chips	33 vs 67a	$p < 0.001$
Carrots/Chips	Vegetables vs Chips	34 vs 66a	$p < 0.001$
Beetroot/Chips	Vegetables vs Chips	37 vs 63b	$p < 0.01$

Means with different superscripts differ significantly.

Children's hedonic scaling for the preference of colour, cooking method, brown vegetable, oil type, coating and potato flour replacement, is given in Table 6. Firstly, there was a significant ($p < 0.01$) preference between the green bean and beetroot chips and the carrot chip, but not between the green bean chip and beetroot chip (Table 6). The carrot chip had the highest score (4.39) and green bean chips the lowest (3.35). Most people associate green beans with vegetables that don't taste good (Fresh for kids, 2011b), and children grow up with this perception as they adopt the habits from their parents (European Food Information Council, 2012). Akis (2014) stated that the reason people dislike beetroot, is because they think it taste like dirt. Carrots, on the other hand, are one of the most widely eaten foods in the world and are eaten as a savoury and sweet dish. It is also one of the first solid foods that is introduced to children and is available in every shop throughout the year (Fresh for kids, 2011a).

There was no difference between the liking for oven baked (4.21), deep fried (4.18) and air carrot chips (4.20) (Table 5). This is an interesting observation in that children four to six years old showed no preference for oily food. Graaf et al. (2010) found that steamed and boiled vegetables are preferred over mashed, grilled, stir fried or deep-fried vegetables; children in the study were more familiar with boil and steam methods and this familiarity influenced favouritism. Deep fat frying is not considered a healthy cooking method, as fat is a major contributor to heart disease, diabetes, hypertension and some types of cancers (Krukowski, 2011). The air fryer is a rather sophisticated and expensive apparatus, but could in the long-term, save money on the oil that would have been used in the traditional method (Taste.Com.AU, 2014). It was decided to use oven baking for the remaining three tests as baking is the healthiest option (Gokemen, et al. 2010).

A selection of brownish vegetable chips was prepared, as this colour is known to stimulate the digestive system. Orange is also known to treat digestion problems (One earth one design, 2007). In this test, the lowest scoring vegetable chips were cauliflower (3.63) and cabbage

(3.55), which differed significantly ($p < 0.001$) from butternut + sweet potato (4.02), sweetcorn (4.02), butternut (4.07) and sweet potato (4.16) (Table 6).

Table 6 ANOVA of child panel preference scores for vegetable chips (n=100).

	Vegetable chips	Preference Score
Study 1: colour	Green bean	3.35 ^a
	Carrot	4.39 ^{cdefgh}
	Beetroot	3.63 ^a
Study 2: cooking method	Oven baked carrot	4.21 ^{bcdef}
	Deep fried carrot	4.18 ^{bcde}
	Air fried carrot	4.20 ^{bcde}
Study 3: brown vegetable	Butternut	4.07 ^{bc}
	Sweet potato	4.16 ^{bcd}
	Cauliflower	3.63 ^a
	Sweetcorn	4.02 ^b
	Cabbage	3.55 ^a
	Butternut + sweet potato	4.02 ^b
Study 4: oil type	Sunflower oil sprayed oven baked sweet potato	4.47 ^{defg}
	Olive oil sprayed oven baked sweet potato	4.56 ^g
Study 5: coating	Smash coated oven baked sweet potato	4.31 ^{bcdefg}
	Kellogs crumbed oven baked sweet potato	4.49 ^{efg}
Study 6: replacement of potato flour	50% chickpea replacement oven baked sweet potato	4.48 ^{defg}
	100% chickpea replacement oven baked sweet potato	4.53 ^{fg}
	Significance level	$p < 001$

Means with different superscripts in the same column differ significantly

Cauliflower and cabbage are both known for their characteristic umami taste (Umami Information Centre, 2013) and although the amino acid taste is favoured by children when used as a seasoning, they are not fond of it occurring naturally in vegetables. Sweet, umami and salty substances are initially preferred by children, and bitter and sour substances are rejected (Beauchamp & Menella, 2009). Seasonings only contain salty, sweet and umami tastes, which are preferred, while fresh vegetables, like cauliflower, also contain a bitter taste. The bitter taste can possibly be caused by growing conditions and overcooking (Grantenstein, 2014). Hargreaves (2012) found that people's preference for cauliflower starts to grow when the preparation method changes; people prefer it crunchy above mushy. There is a definite change in people's attitude towards the consumption of cauliflower in light of the popularity of the low carbohydrate diet or *banting*, which is endorsed by internationally acclaimed researcher and athlete Tim Noakes (Noakes, Creed, Proudfoot, Grier & Caradoc-Davies, 2014). Recipes and new products are developed where cauliflower is used to prepared carbohydrate free 'mash' and 'rice'.

Regarding the liking of the butternut, sweet corn, sweet potato and butternut + sweet potato chips, there were no differences. The popularity of butternut is increasing, because of increasing awareness of healthier diets. Butternut squash has the best nutritional value of any squash type (Wright, 2008). In South Africa, butternut and sweet potato are usually eaten as

sweet vegetables, cooked with butter and sugar (Sarie Kos, 2012; Kreatiewe kos idees, 2013). Furthermore, corn is a staple for the majority of the South African population (Smyth, Philips & Castle, 2014), thus explaining the liking for the sweet corn chip. The sweet potato chip had the highest numerical value of the brownish vegetable chips and it was decided to continue the other studies with this chip type.

From Table 6 it is also clear that there was no preference for the kind of oil used. Thus, the children in this study did not really care for the kind of oil as long as there was an oily aroma present. Fat gives food a unique texture, flavour and aroma, which children associate with chips (Almiron-Roig & Drewnowski, 2010).

When the sweet potato chip was covered with a coating, again there was no preference for either of the coatings (Table 6). Although natural human instinct is to have full control over everything they eat (Szczesniak, 2002), not all children can manipulate textures that are crunchy and this can lead to either a dislike or a preference towards the food consumed (Graaf et al., 2010).

For the replacement of the potato flour with 50% and 100% chickpea flour, there also was no preference between the two samples. Both scored very high, with the 50% chickpea replacement scoring 4.48 and the 100% chickpea replacement scoring 4.53 (Table 6), representing 'like a little' to 'like a lot' on the hedonic scale (Figure 1). This result is very important, as it showed that the nutritional composition of the vegetable chip can be improved, without losing flavour and taste appeal. Chickpea flour has an earthy, beany flavour, which could be overwhelming for some people, but it can be balanced out with other ingredients, such as sweet potato, as in this case (Oh She Glows, 2013).

Figure 3 is the spider plot, representing the results from all the hedonic scaling. It is clear that most of the vegetable chips scored more than four on the hedonic scale, translating into 'like a little'. Green beans, beetroot, cauliflower and cabbage scored less than four, but more than three, representing 'neither like nor dislike' on the hedonic scale. No sample scored less than three, with green beans having the lowest numerical value of 3.35 (Table 6). The oven baked sweet potato chip, sprayed with olive oil had the highest numerical value of 4.56 (Table 6).

Table 7 is a summary of the ANOVA on the effect of population group, gender and age and their interactions on sensory preference scores for different vegetable chips. Population group had a significant effect on green bean ($p=0.0189$), butternut ($p=0.0018$) and cauliflower ($p=0.0218$), while gender had a significant effect on beetroot ($p=0.0158$), butternut ($p=0.0307$) and cauliflower ($p=0.0371$) chips. Age had a significant effect on green bean ($p=0.0338$) and sweet potato ($p=0.0445$) chips. The interaction between gender and age had a significant effect on 50% replacement with chickpea flour in oven baked sweet potato chips ($p=0.0378$) (Table 7).

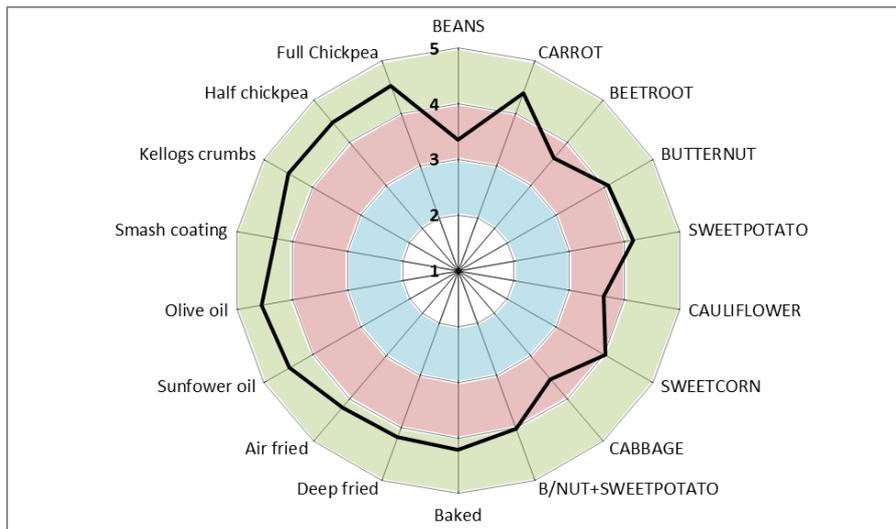


Figure 3 Spider plot of child panel preference scores for vegetable chips

For the green bean chip, the white children gave significantly ($p=0.0189$) higher scores (3.74) than the black children (2.96). Black children (4.42) scored butternut chips significantly ($p=0.0018$) higher than white children (3.72). Also for cauliflower chips the black children's score (3.96) was significantly ($p=0.0218$) higher than that of the white children (3.30) (Table 8). The girls' score (4.04) for beetroot chips was significantly ($p=0.0158$) higher than that of the boys (3.28). For both the butternut (4.30) and cauliflower (3.91) chips, the boys' scores were significantly ($p=0.0307/p=0.0371$) higher than that of the girls (3.80/3.30) (Table 8). Also from Table 8 it is clear that the four year olds (3.75) scored the green beans significantly ($p=0.0338$) higher than the five (2.94) and six year olds (2.80). The four year olds (4.23), this time along with the five year olds (4.31), also scored the sweet potato chips significantly ($p=0.0445$) higher than the six year olds (3.60). There was, furthermore, a significant ($p=0.0378$) interaction between gender X age effect for the oven baked sweet potato chip, where 50% of the potato flour was replaced with chickpea flour. The five year old girls (3.55) scored this chip significantly ($p=0.0378$) lower than the four (4.64) and six year old girls (4.86), as well as the four (4.44), five (4.62) and six year old boys (4.63) (Table 9). Factors which could play a role in these variations would include the difference in socio-economic development and wealth, as well as the diversity in prices, availability and accessibility of these foods, as well as taste preferences (Love & Sayed, 2001; Naude, 2013).

Table 7 ANOVA on the effect of population group, gender and age and their interactions on sensory preference scores for different vegetable chips.

Chip	Population group	Gender	Age	Population group X Gender	Population group X Age	Gender X Age	Population group X gender X Age
Beans	p = 0.0189	p = 0.1923	p = 0.0338	0.2224	0.4719	0.5908	0.5507
Carrot	p = 0.9293	p = 0.4691	p = 0.1428	0.9140	0.7556	0.8310	0.9239
Beetroot	p = 0.2349	p = 0.0158	p = 0.2275	0.3487	0.3016	0.2915	0.7813
Oven baked	p = 0.7502	p = 0.8882	p = 0.1386	0.6503	0.2599	0.2612	0.1472
Deep fried	p = 0.6816	p = 0.6839	p = 0.2474	0.9756	0.7378	0.5235	0.7272
Air fried	p = 0.1855	p = 0.8206	p = 0.6744	0.8213	0.5010	0.4811	0.1989
Butternut	p = 0.0018	p = 0.0307	p = 0.2258	0.2143	0.7184	0.9113	0.5997
Sweet potato	p = 0.0607	p = 0.2652	p = 0.0445	0.5381	0.2926	0.8531	0.9994
Cauliflower	p = 0.0218	p = 0.0371	p = 0.1645	0.6670	0.9647	0.7248	0.7959
Sweetcorn	p = 0.7469	p = 0.7364	p = 0.9886	0.4911	0.5668	0.1593	0.8986
Cabbage	p = 0.9436	p = 0.1664	p = 0.3568	0.2968	0.9192	0.0645	0.9013
Butternut + Sweet potato	p = 0.6512	p = 0.7533	p = 0.3759	0.2343	0.9934	0.5360	0.4546
Sunflower oil	p = 0.9166	p = 0.8964	p = 0.8474	0.7325	0.8462	0.2977	0.9709
Olive oil	p = 0.6230	p = 0.2947	p = 0.4826	0.4543	0.9138	0.8409	0.9991
Smash coating	p = 0.1725	p = 0.8767	p = 0.1022	0.8491	0.7149	0.4748	0.3972
Kellogs crumbs	p = 0.2969	p = 0.2997	p = 0.3634	0.1805	0.1822	0.1891	0.1956
50% chickpea	p = 0.9999	p = 0.5433	p = 0.2439	0.2289	0.4434	0.0378	0.4932
100% Chickpea	p = 0.7387	p = 0.4187	p = 0.4981	0.1652	0.5112	0.2186	0.3586

Table 8 ANOVA of the significant effects of population group, gender and age on child panel hedonic scores for vegetable chips.

Chip	Population group		Significance level	
	Black	White		
Green bean	2.96 ^a	3.74 ^b	p = 0.0189	
Butternut	4.42 ^b	3.72 ^a	p = 0.0018	
Cauliflower	3.96 ^b	3.30 ^a	p = 0.0218	
Gender				
	Female	Male		
Beetroot	4.04 ^b	3.28 ^a	p = 0.0158	
Butternut	3.80 ^a	4.30 ^b	p = 0.0307	
Cauliflower	3.30 ^a	3.91 ^b	p = 0.0371	
Age				
	4 years	5 years	6 years	
Green bean	3.75 ^b	2.94 ^a	2.80 ^a	p = 0.0338
Sweet potato	4.23 ^b	4.31 ^b	3.60 ^a	p = 0.0445

Means with different superscripts in the same row differ significantly

Table 9 ANOVA on the significant interaction between gender X age effect on child panel hedonic scores for 50% chickpea replacement chips.

Gender	Age	Sensory preference score for Half chickpea
Female	4	4.64 ^b
	5	3.55 ^a
	6	4.86 ^b
Male	4	4.44 ^b
	5	4.62 ^b
	6	4.63 ^b
Significance level		p = 0.0378

Conclusions

According to the DRA's, children need a high level intake of vegetables, which must consist out of a variety of vegetables. Fast food is a very popular and frequent choice, although it is unhealthy and has negative effects on health. Consumers are becoming more aware of healthier options, but are still looking for satisfying choices.

As proven in the paired preference test, children preferred the picture of a potato chip above a vegetable picture. Using the concept of a chip perception, different vegetables were tested, while they were processed to look like a chip. Carrots were preferred over green beans and beetroot. For brown-type vegetables, the sweet potato, butternut, butternut + sweet potato and sweet corn chips were preferred to cauliflower and cabbage. From all the potato based vegetable chips, the sweet potato was the most preferred vegetable. Further tests performed with this chip found no significant differences in preparation methods. The baked option was subsequently chosen for further tests because it was the healthiest option. There were no significant differences in preference between different oils and different coatings. When the chip was improved with chickpea flour, there was not a significant difference between the samples.

These findings are important, because there are healthy alternatives to traditional fried chips, which are still accepted. Caretakers must adopt the healthier principles and feed children more vegetables, using creative methods to improve their acceptability. Consequently, potato based vegetable chips or the chickpea based vegetable chips can become very popular in future markets.

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