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Nutrition Education in a Thinking World

Ang Kai Ling

INTRODUCTION

Informal observation of Diploma in Education students specializing in Home Economics has revealed some anxiety and lack of confidence among them. The first reason for this might be that, historically speaking, home economics is seen by the students as not prestigious as compared to courses like Pure Science or Engineering. Secondly, it could be that home economics was not, until recently, an examinable subject; and thirdly, the subject is offered only at the diploma and not at the degree level. All these reasons contribute to the low self-esteem of some students. Another study (Lee 1993) has described diploma students doing biology at the National Institute of Education (NIE) as surface learners. These students too were not highly motivated. Research undertaken to analyse the reasons for their weaknesses has come up with some ideas for teacher intervention that are designed to help them. This article is a report on the research.

Part 1 provides details of the assessment of weaknesses and Part 2 discusses teacher intervention. The subjects studied are 15 students in the first- and second- year of the Diploma in Education Programme specializing in home economics.

ASSESSMENT OF WEAKNESSES

SUBJECTS AND METHODOLOGY

The subjects (N = 15) of the study were first- and second- year students of the Diploma in Education Programme, specializing in home economics.

The Learning and Study Strategies Inventory (LASSI) was used to assess students' use of learning, study strategies and methods. As the inventory is a diagnostic and prescriptive measure of thoughts and behaviours that relate to successful learning, it is an appropriate tool to achieve the objectives of the study. LASSI measures the following:

- ATT : attitude and interest
- MOT: motivation, diligence, self-discipline, and willingness to work hard
- TMT : use of time management principles for academic tasks
- ANX: anxiety and worry about school performance
- CON: concentration and attention to academic tasks
- INP : information processing, acquiring knowledge, and reasoning
- SMI : selecting main ideas and recognizing important information
- STA : use of support techniques and materials
- SFT : self testing, reviewing, and preparation for classes
- TST : test strategies and preparation for tests

As these thoughts and behaviours can be altered through educational intervention, it makes this study more meaningful and useful. Evidence for the reliability of LASSI has been found to be strong too. The test-retest correlations of the 10 scales (3-week interval) range from 0.72 to 0.85 (Mealey 1988).

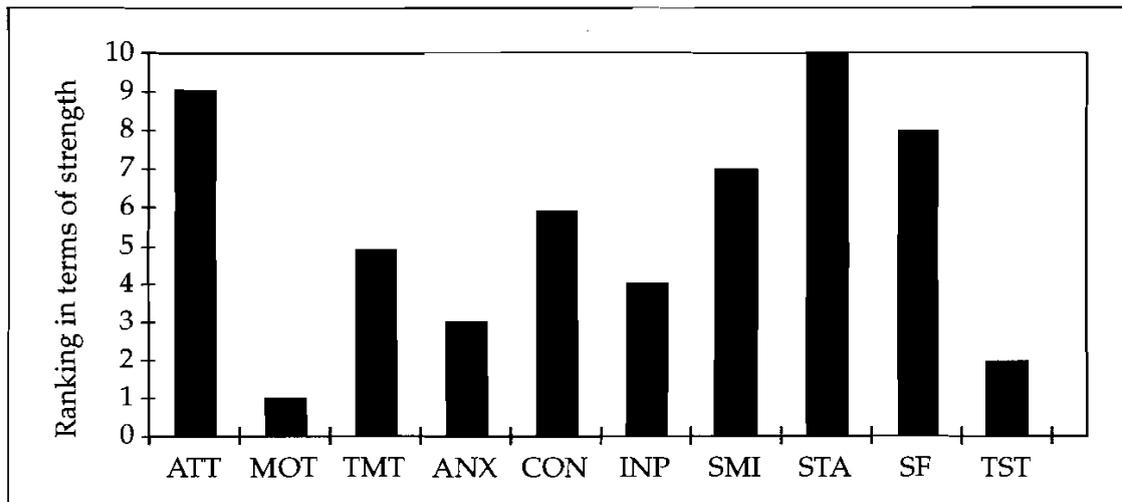
The author then scored the number of students below the 50th percentile, above but below the 70th percentile, and above the 70th percentile. Measurements of attitudes or behaviours below the 50th percentile are considered as weaknesses which students need to improve upon. The attributes and behaviour are then ranked in the order of the weakest being 1 and the strongest being 10.

FINDINGS OF LASSI

In descending order of weaknesses, students were found to be weakest in MOT, then TST followed by ANX, INP, and TMT. The rest of CON, SMI, STA, SFT, and ATT were relatively strong (Table 1).

MOT includes motivation, diligence, self-discipline, and willingness to work hard. Hence, we do not know exactly which specific area is the main problem. However, combining the information of TST (test strategies and preparing for tests) being the next weakness, one can deduce that the students are weak in self-discipline and organizational skill in preparing for tests, rather than not having the interest or motivation. This is confirmed by the fact that ATT (attitude and interest) had a high score in the ranking.

ANX is the next limiting factor which may cause them to be surface learners. Being anxious may limit one's learning and creativity and thus

Table 1: Lassi Scales in descending order of weaknesses

may have affected the low score of INP (information processing or acquiring knowledge). The lack of time management or organization skills (TMT) among these students do not appear to produce effective and active learning.

In short, in descending order, the three major weaknesses among these students were self-discipline and organizational skill to prepare for tests, anxiety and information processing and acquiring knowledge.

INTERVENTION

SUBJECTS

The sample (N = 9) consists of nine second-year students who were doing their Applied Nutrition Course in the second semester. The rest of the first-year students were in the schools for their Teaching Practice, hence they cannot be included in the intervention study.

METHODOLOGY

Use of Concept Mapping and Anxiety Test

Concept mapping, a technique developed by Novak and co-workers (1977), serves as a tool to help learners organize their cognitive frameworks into more powerful integrated patterns. It, therefore, helps students to organize concepts into hierarchical structures and link what they already know with the new knowledge. Logical connectives, indicating relationships between concepts, were later added into concept mapping. Ausbel (1968) suggested that individuals learn meaningfully by building knowledge on the basis of what they have

already known. He distinguished between “rote” learning and “meaningful” learning by stating that meaningful learning occurs when the learner’s existing knowledge interacts appropriately with new learning. Rote learning of the new knowledge occurs when no such interaction takes place.

The usefulness of concept mapping as a strategy to facilitate meaningful learning has been demonstrated in many science classrooms, but not in tertiary home economics lessons. Hence, these students were introduced to the concept-mapping technique and in the subsequent three lectures, concept mapping was used. Two pre- and post-tests were done on two lectures: Weight Management and Coronary Heart Disease.

The pre-test was conducted before introducing the concept-mapping technique, whereby the students were given some words relating to Weight Management and were asked to link these words showing their relationship. At the end of the Weight Management lecture, they were given a short achievement test.

After concept mapping was introduced and used to teach the same Weight Management topic again, these students were again asked to link those same words given before (post-concept-mapping test). They were also given a similar short achievement test (different Multiple & True/False Questions but the “thinking” question). These achievement tests were measured to examine any possible treatment effect due to exposure to the concept mapping.

Many studies on the interaction between anxiety and instructional methods have revealed negative correlation between anxiety and students’ achievements (Fraser, Nash & Fisher, 1983; Jegede *et al.* 1988; Gaudry & Sielberger 1971). Jegede *et al.* (1990) have demonstrated a significant reduction of anxiety with the use of concept mapping in biology lessons. Anxiety has been found to affect learning (Fraser *et al.* 1983; Novak *et al.* 1983; Okebukola & Jegede 1989). It is one of the pressures which exerts considerable influence on learners’ intellectual competence and performance (Baird 1986). The level of anxiety was measured using Zuckerman’s (1960) Affect Checklist containing modifications made by Docking (1978). The instrument consists of 21 key words embedded in a total of 60 adjectives (Appendix I). Students were instructed to circle words that describe how they feel about learning nutrition. The 11 words designated (+) are scored 1 if circled and 0 if not circled. The other ten words designated (-), a score of 0 if they are chosen and 1 if they are not circled. The remaining words are

ignored in the scoring procedure. Each subject's total anxiety score is obtained by summing the scores of the 21 key words. The instrument has been found to have a good concurrent validity (Jegade *et al.* 1990)

Zuckerman's anxiety test was conducted before the introduction of concept mapping and again after the third lecture using concept mapping.

Use of Project Work

The findings from the LASSI instrument indicated that this group of students was weak in INP (*information processing, acquiring knowledge and reasoning*). Providing opportunities like project work with a written report should help as it requires thinking skills and/or mastery of a structure of knowledge, and the ability to translate knowledge and understanding into action. Hence, INP skills develop.

Therefore, modifying the student feedback form from Garvin *et al.* (1995), the author did an in-class questionnaire survey with the first- and second-year students soon after they had completed their project work in the first semester. The objective of conducting this survey is to see how effective project work can be of help to overcome the weakness in INP.

First-year students were asked to illustrate constructive diet recipes for vegans using the mutual supplementation effect of plant proteins. There were three in a group. They tested the recipes (modified or original), and took photographs of these for charts illustrations.

Second-year students attempted different questions in groups of twos. They were asked to write about the following topics in the Singapore context: eating disorders, breast feeding, elderly nutrition, and nutrition among school-going children.

FINDINGS OF THE INTERVENTIONS

Concept Mapping

Comparing individual concept maps of the students before and after the treatment (Appendix II), it was evident that conceptual change has occurred after the treatment, based on the following observations:

- More valid linkages. A connection between concepts is correct and is qualified with a proper proposition.
- More cross linkages were observed.

Students were also asked to write their opinion about concept mapping. These are some phrases used:

Concise, understand more, more confident, able to relate factors or information accurately, helps to organize my thoughts, gives a clearer picture of the situation, helps in remembering and memorising terms and concepts, tedious process but useful, good for quick revision before examination.

Anxiety Tests

Highest or maximum score of anxiety is 20.

As the survey was collected anonymously, the author could not track the number of students who had improved in their anxiety scoring (Table 2). However, she could see the improvement in anxiety level in general. The author believes that given more concept-mapping practices and the anxiety test not being conducted just before the examination (pre- and post-anxiety tests were taken 2 and 3 weeks before the examination, respectively), the scoring of the anxiety level would be much lower than what it is now.

Table 2: Anxiety scores for 2nd Year Dip. Ed. (Home Econ.)

Anxiety score	No. of students (Pre-test) n = 9	No. of students (Post-test) n = 7*
7	0	1
8	1	0
9	0	1
10	3	3
11	3	2
12	1	0
15	1	0

*2 students were absent

Achievement Tests

Multiple choice and True/False questions

There were fewer mistakes made in the post-achievement test (Table 3).

Table 3: Achievement Tests Score for 2nd Year Dip. Ed. (Home Econ.)

No. of mistakes made	No. of students (Pre-test) n = 9	No. of students (Post-test) n = 7
0	0	2
1	1	3
2	0	1
3	4	1
4	1	0
5	1	0
6	1	0

The thinking question

Assume that you have received a mail order offer on a new miraculous weight loss method using a massage insole (marketing leaflet enclosed). Name and summarize the criteria you would use to evaluate the scientific principles and approaches to weight loss claimed by this method, so as to come to a decision of purchasing the product.

Pre-test answers were general and more of a layman's approach

Examples of answers from two students:

I would consider firstly, the truth or reality behind the air pressure method and whether such stimulation could effectively induce weight loss. Secondly, I would like to know whether such a method helps to relax (not unlike foot reflexology) the body instead of helping people to lose weight. I would like to know the estimated period whereby I can see clear, effective results.

Student A

Body metabolism is usually affected by activity. The more active a body is, the higher the metabolism and vice versa. How can massaging increase a body's metabolism? Why do we need the insole, can't we just massage our feet? How is the fat burned? If it works, then won't we just be losing weight, not toning our body which needs exercise to do so?

Student B

Post-test answers were more specific and in-depth

Basically, the method does not include how the fats are going to be burnt and since it has the main aim of increasing weight loss, whether more fats are going to be effectively burnt. The method seemed to be more of a reflexology method and does not show the tested and more effective components of sound weight management.

Student A

To increase weight loss— must do the following:

- *exercise (increase activity)*
- *improve eating habits*
- *change thinking concept (psychologically)*
- *do not over-eat (do not eat when not hungry)*
- *increase carbohydrate foods, reduce fatty foods*
- *cut down on intake*
- *eat small regular meals*
- *do not eat in front of T.V*
- *environmental factors*
- *It is easier to maintain weight than to lose weight.*

Student B

Another test was carried out on cancer and nutrition. Similarly, there were relatively fewer mistakes made. Memory retention was better.

Unexpected results

After the last lecture, students initiated a revision session of all the topics covered in the module, using concept mapping. It was a pleasant surprise to see that they were motivated to study.

Rapport with students had also improved and they were less afraid to make mistakes.

Project Assessment

Feedback on what they like best about the project were positive, with remarks such as:

better understanding of what high value protein meals are and how to improve a vegetarian's diet

I learn more about my group members and found the project stimulating!

It gave me an opportunity to visit MOE and some polyclinics to gain more information. I was surprised with the various details given to me.

Get to know more about the topic.

To know the children's food behaviour and how to interest them to enjoy their meals.

The collection of statistics, interviews conducted.

Group work enables me to discover more of my classmates and was enjoyable.

Get together with classmates to discuss and practice teamwork.

Being able to work as a team and the satisfaction upon completion of the project.

Able to create dishes with limited resources.

The practical aspect where one has to do some research, source for materials and actually have a hands-on experiment (cooking).

The room for creativity and the final part when we evaluate the project through the photographs. Satisfied and involved.

Be able to meet professionals in the Institute of Health, to do something beyond the classroom context. I feel as though there is a sense of practicability in this project.

On a scale of 1 to 5 in the measurement of attributes (Table 4), there was a shift from the lower scores to the higher scores in all attributes for all students(except one). This result indicated the usefulness of projects in developing the cognitive skills of the students. In other words, more than 80 per cent found that the project has helped to improve these skills.

Table 4: Students Assessment of Attributes Developed in the Project Work

Scale (%)	5 (n = 15)	4 (n = 15)
problem solving	0 (0%)	12 (80%)
material search	7 (47%)	7 (47%)
application of nutritional knowledge	6 (40%)	9 (60%)
analysis & presentation of materials	6 (40%)	6 (40%)
communication/interpersonal skill	8 (53%)	5 (33%)
integrating/organizing information	9 (60%)	6 (40%)
time management	5 (33%)	7 (47%)

CONCLUSION

Being aware of the students' weaknesses is not sufficient. In order to excel in education in today's thinking world, we need to get to the roots, that is, factors that cause these weaknesses. There is a Chinese saying, "apply medication directly to the root of the problem". Hence, with proper prognosis and understanding of students' weaknesses, be it self-discipline, preparation for examinations, anxiety, time management or information processing and so on, the task of helping them to engage in meaningful active learning can begin.

From this study, we can see that it is not a hopeless situation. On the contrary, we can do much to cultivate "thinking" and motivated students. The concept-mapping technique has provided the students a learning tool to help them organize their thoughts and conceptualize the subject better. Due to time constraint, the author was unable to test this with a larger sample size and for a longer period of time. However, with these few sessions of using concept mapping, there were already positive results and feedback from the students. Students were able to better cope with their anxiety too.

Projects with written reports have also helped students overcome their weakness in INP. These projects required them to search for information, solve problems, select and synthesize information collected, and finally present them in the given time frame. They also have to learn to work with their team-mates. The majority of them (80 per cent) have found the project work useful in developing their cognitive skills.

In line with Herzberg's (1968) findings, the sense of security of students has to be met first, by establishing a trusting learning atmosphere, and providing an active learning environment and learning tools such as concept mapping and field work. The author finds that the students are not only more confident in the subject, but they can also develop other skills and virtues such as communication, resourcefulness, perseverance, teamwork spirit, and so on. However, only together with appropriate assessment can we achieve excellence in nutrition education in a thinking world.

SUMMARY AND IMPLICATIONS FOR INSTRUCTORS

Increasingly, appropriate nutrition is becoming recognized as an important factor to a good quality of life. As people's lifestyle is getting more affluent with maids taking over house chores, the traditional image of home economics as a domestic subject has to change. Modern career mothers require skills other than cooking and sewing. They have more functions to perform. In fact, in the author's opinion, more is expected from them. Hence, we need to equip them with skills such as organization and planning in all areas of home management. They need to know how to plan and shop for meals that are appropriate for all members in the family. Other knowledge such as how to cultivate good eating habits among the young and helping them to enjoy healthy foods are some areas the students are learning now. We can, therefore, see that they have an important role in building a healthy community. We can help the students realize their importance and the society needs to recognize them.

We can do this by providing appropriate career prospects as a motivator. Hence, job matching and compensation become important factors. Unlike other graduates of the General Diploma in Education, instead of being posted to primary schools, this group of home economics Diploma graduates are posted to secondary schools to teach. They may be teaching other subjects besides home economics, such as English or science, together with the Bachelor degree graduates. Their confidence is usually affected when their students start comparing them with Bachelor degree graduate teachers.

The author is of the view that a Bachelor Degree in home economics, or at least an Advanced Diploma Degree, could be provided as an opportunity for this group of students and in-service home

economics teachers to upgrade themselves. As for the diploma graduates, they should be posted to primary schools like the rest of the Diploma in Education graduates. However, currently, there is no nutrition or home economics curriculum at the primary level. Cultivating good eating habits and enjoying healthy eating need to start from a very young age, as it is relatively difficult to unlearn bad eating habits in the later stage of life. The author feels strongly that instrumental basic nutrition and not merely health education, should be included in the primary curriculum. For example, 'Kid's in the Kitchen' has been successfully conducted even among the pre-schoolers in many countries. Why are we not introducing this to our primary schools?

One thing to note, though, is that too many new techniques may appear to temporarily disrupt studying . Without support, encouragement and the opportunity to practise in context, it is likely that any new technique will be dropped prematurely before it starts being helpful. According to a Chinese proverb, "A journey of a thousand miles starts with a single step". As we are in the caring and nurturing profession, the author feels that we need to provide the necessary support, encouragement and opportunities to our students and perhaps, even to ourselves.

Last but not least, given such a short time frame for this study, the author has only managed to try out some of the meaningful active learning teaching tools in the classrooms. She is, therefore, of the opinion that more confirmation studies with a larger sample size and a longer duration of time need to be carried out.

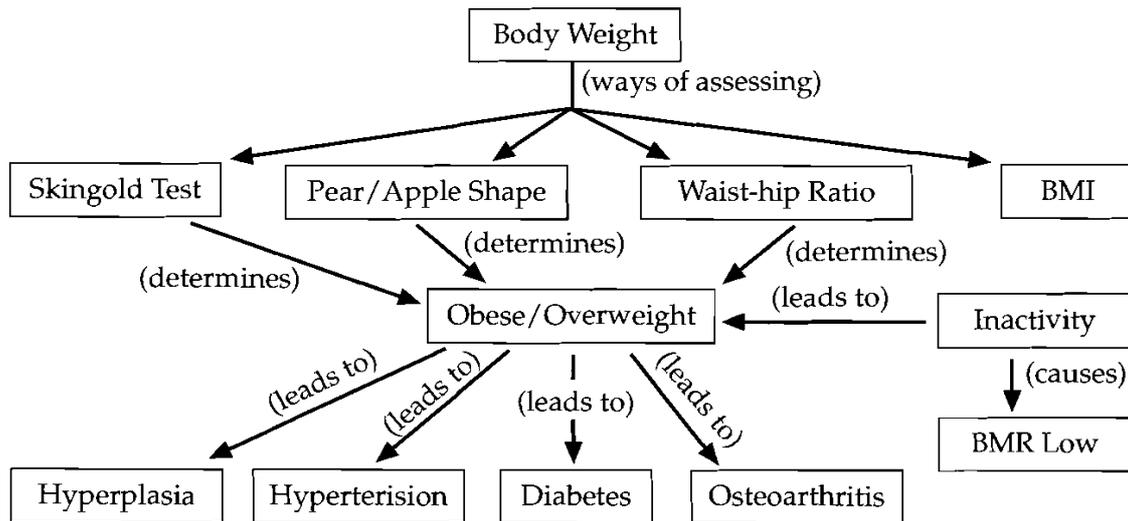
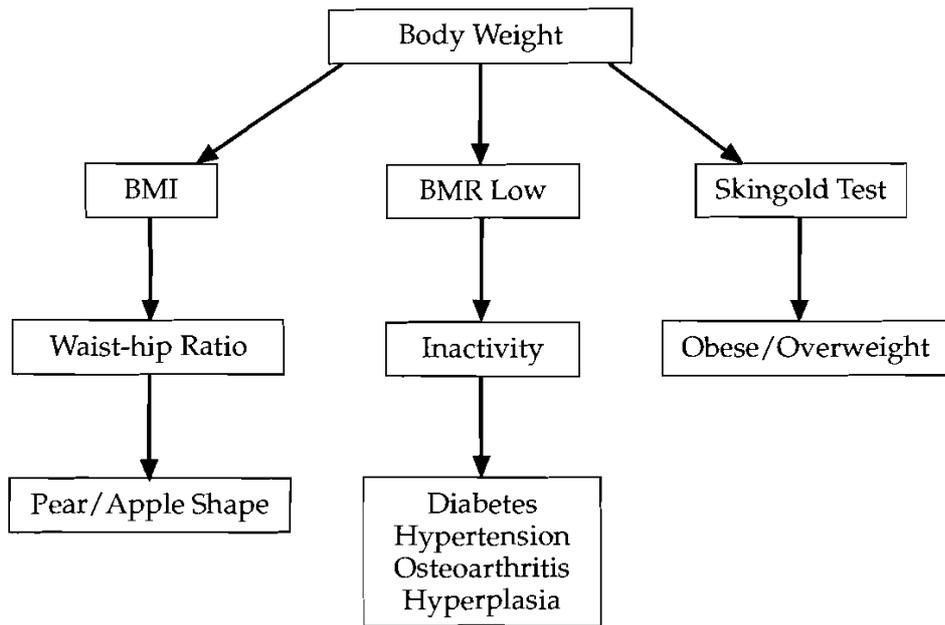
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APPENDIX I : ZUCKERMAN'S AFFECT ADJECTIVE CHECKLIST AS MODIFIED BY DOCKING

The words below could describe how you feel about nutrition. Read through the list of words and circle those which describe how you generally feel about studying nutrition. You may underline as many or as few words as you wish.

absorbed	afraid (+)	aimless	ambitious	annoyed
aware	bored	calm (-)	careless	cautious
challenged	cheerful (-)	cheated	comfortable	confused
contented (-)	creative	curious	dedicated	desperate (+)
disappointed	efficient	entertained	excited	fearful (+)
fortunate	frightened (+)	happy (-)	hopeless	impatient
incapable	inspired	interested	joyful (-)	lazy
loving (-)	miserable	misplaced	nervous (+)	organized
overloaded	panicky (+)	pleasant (-)	pleased	productive
pushed	refreshed	regretful	rewarded	satisfied
secure (-)	serious	shaky (+)	steady (-)	tense (+)
terrified (+)	thoughtful (-)	upset (+)	weary	worried (+)

APPENDIX II



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