The Online Journal
of
New Horizons in Education

Message from the Editor-in-Chief

I am happy to inform you that the Turkish Online Journal of New Horizons in Education (TOJNED) has been published second issue in 2011. The first issue covered the selected papers from the conference which is entitled as International Conference on New Horizons in Education. With the first issue online with selected papers from the conference, our journal opens an academic debate in contemporary education practices in respect to different fields. In this respect, TOJNED is interested in various researches in education in order to diffuse and share the knowledge with academic community.

The journal promotes knowledge sharing in the academic and professional agendas within multi-dimensional angles. Exploring professional issues through different research approaches allow researchers, practitioners and students to reconstruct knowledge from relevant theories and techniques. Therefore, I am pleased to publish second issue which different papers from various fields are shared with professionals.

And as you know TOJNED will organize INTE 2011 (International New Horizons in Educational Conference – 2011 www.int-e.net) at Instituto Politecnico da Guarda between June, 6-8 2011. INTE series is an international educational science activity for academics, teachers and educators. This conference is now a well known educational science event. It promotes the development and dissemination of theoretical knowledge, conceptual research, and professional knowledge through conference activities. Its focus is to create and disseminate knowledge about the educational science for learning and teaching in education.

We are pleased to announce that the presented papers at the International New Horizons in Education Conference 2011 will be reviewed for the July, 2011 and October, 2011 issues of TOJNED.

Call for Papers

TOJNED invites article contributions. Submitted articles should be about all aspects of educational science. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJNED.

 April 01, 2011
Prof. Dr. Aytekin İŞMAN
Editor-in-Chief of TOJNED

Message from the Editor

I am pleased that TOJNED provides an opportunity to researchers, academicians and students to gain insights on academic and professional issues on education within different areas. Researches from different aspects of education and different research approaches make great oppurtunitiy to professionals and academic for enhancing their professional knowledge. It is a great pleasure for me to share TOJNED second issue in 2011 with you.

I would like to invite all researchers to share their experiences and knowledge to International Conference on New Horizon in Education In 8-10 June, 2011. The conference will be held in Guarda and is hosted by Polytechnic Institute of Guarda. Presented papers in the conference will be selected to be published in the TOJNED.

I would thank all authors and associate editors on their great contributions to the second issue of TOJNED.

April 01, 2011
Prof. Dr. CEM BİROL
Editor, TOJNED

Table of Contents

DEVELOPMENT OF BASIC COMPETENCES IN SCIENCE AND TECHNOLOGY IN MINORITIES WITH LANGUAGE-INDEPENDENT COMPUTER SIMULATIONS

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Abstract: With the growth of multimedia computers became more important than ever. Internet became linking media that connects people. But circumstances are far from being perfect. On one hand, we have circumstances similar to those in Eden, where students can use various didactical tools, and on the other, students are still left with the white chalk and black board. The main purpose of this article is to present the problem of accessibility of multimedia to users that have limited knowledge of foreign language (in most cases English).
On the Faculty of Natural Sciences and Mathematics we developed interactive computer simulations of biological laboratory exercises. Simulations are equipped with translational support that enables users a translation into a chosen foreign language. The simulations Osmosis and Greenhouse effect are presented in this article and can be used by minorities in Slovenia as well as by anybody else who is not fluent in Slovenian language.

Keywords: language-independent computer simulations; computer based laboratory exercises; osmosis; greenhouse effect; minorities' education

Introduction

In the last years internet is in full growth and consequently became very important educational tool (Mayfield & Ali, 1996; Fancovicová et. al, 2010). Students find it important for searching the references, writing papers and communicating in student groups (Lagier, 2003). There have also been researches on positive development the scientific competences with the computer supported laboratory work (Špernjak & Šorgo, 2009) and multimedia (Starbek et al., 2010). Students were active and generally like the new technology in the laboratory.

Along with the new technology, English language was introduced. Especially in the beginning the need of knowing English was of great importance. In the article we presented the foreign language as the main barrier when using technology for educational purposes. Insufficient knowledge of English language and lack of educational materials or outdated information in Slovene language are main reasons why the technologies are not used as often as we wanted them to be (Šorgo, 2003; Puhek & Šorgo, 2009; Puhek & Šorgo, 2010).

Manten (1974) detected the fall of scientific works in German and in French and the rise of articles written in English. Today this trend continues and it is clearly seen when a professor wants to publish a scientific article in a well known journal. Top ten journals within biology and education topic are written in English. Another eloquent proof is when a student is applying for a student exchange (Socrates Erasmus, Leonardo da Vinci), then the student usually needs to know at least English or even better the language of the country he/she is applying for. Goodman (2008) found out that Spanish students more likely saw the language as a barrier than English colleagues. Šorgo (2003) declared that the problems of not understanding the foreign language decrease with the student's years of studying. In Slovenian secondary school ("gimnazija") students of the last grades had least

1

problems with the understanding foreign literature than the freshmen. In primary school, when students are even younger and have less foreign language knowledge, the problems of understanding can get insurmountable (Puhek & Šorgo, 2009).

There are many possibilities to overcome those obstacles. One of the possible solutions is the usage of translating tools and dictionaries (Schloman, 2000), or the usage of materials without text (pictures, silent movies, animations without text), where language does not present a problem (Puhek & Šorgo, 2009).

On the Faculty of Natural Sciences and Mathematics we developed interactive computer simulations of biological laboratory exercises. The simulations Osmosis and Greenhouse effect were equipped with translational support that enables translations into a chosen foreign language. In this article presented simulations can be used for practising before or after the actual laboratory work or as a virtual laboratory work. The only equipment the user needs is a working computer and a person to translate them from the basic language (for example English) into the desired language of the target group. That makes them possible teaching tool for developing countries or for the minorities. Magos (2007) pointed out the positive effect of usage of minority's mother tongue in the classroom. Students find the atmosphere relaxed and beneficial for the learning process. It was also described that the multicultural approach towards learning has brought diversity and cultural into the classrooms (Bochaca, 2009).

Methodology

The main aim of the research was to point out the language as an important barrier in the field of education. We carried out a comparison of the hits that we got in Google in different languages. To make a credible comparison we translated words in different languages and then searched for the hits. For the search with Google we used the option advanced settings to change the language, in which the hits should be found. Then we typed the translated words in the inputs for word phrases. Option word phrases were used, because in other case results covered all words, what was in most of the cases not correct. Finally, we inserted the gained hit numbers into the table.

The bases for the development of simulations were the computer based laboratory exercises that were carried out with Vernier's sensors (Vernier's data loggers). The results were consequently presented in a graph. Every simulation is an independent program (.exe) with a similar basic structure. The programming language is Microsoft VisualBasic 6.0. The reason for creation of the programs as individual programs was as followed; they are universal, because they do not need extra installations on the computer, and are therefore easier to be spread among users. They are also supposed to work on different operating systems. The user does not need the access to internet to start the simulation. Therefore these simulations are appropriate for countries that have less developed World Wide Web connections. Before the usage of simulations parameters have to be set and then run with the command "Realize".

Findings and Discussion

The research was carried out in two parts. In the first part (with the help of Google hits) we pointed out the problems of understanding of the learning material in foreign language. In the second part we presented our solution to overcome the language barriers. In the future the following part of the research will cover the testing of the simulations in practice.

What does uncle Google says?

Probably not only in Slovenia a popular phrase exists; if you do not know an answer to a question, colleagues directs you to consult "uncle Google". Internet became one of the crucial educational searching tools and it is not unusual anymore that the students found it more useful than printed ("old fashioned") resources (Mayfield & Ali, 1996). With the internet, users can search for all kinds of information in seconds, which is impossible when searching through books. But things are

not as simple, as they seem on the first glance. When users pore over a particular educational information, it can be easily seen that the quantity of information vary from language to language. Here it must be said that things do not appear equal anymore, if students are not perfect in English.

The main goal of our research was to compare the search hits from Google in different languages (Table 1). We expanded the research from Šorgo (2003) and Puhek & Šorgo (2009). As we expected, in general we found increase in number of pages in all languages, but also some exceptions were defined. We realize that it is hard to make decisions based only on searching hits, because internet is almost a living being: searching algorithms are changing all the time, users can publish what they like (Puhek, Šorgo, 2009), some words are same in different languages (Šorgo, 2003), blogs and forums do not give you the desired hits (Puhek, Šorgo, 2009).

With approximately 500 million users (Miniwatts Marketing Group, 2009), official internet language is still English (Šorgo, 2003). When examine the numbers from Table 1, it is clearly seen that even hits from Spanish as the third most spoken language in the world cannot be compared to English. When searching for information in a not widely known language as Slovenian is (2 million citizens), or even smaller countries (some dialects), the number of hits decreases rapidly.

Table 1. Hits from Google of the words in different languages for 2003, 2009 and 2010.

WORD	LANGUAGE	HITS (2003)	HITS (2009)	HITS (2010)
Biology	English	4.780.000	166.000.000	192.000.000
Biología	Spanish	/	6.950.000	9.020.000
Biologie	German	/	5.670.000	4.440.000
biyoloji	Turkish	/	2.310.000	3.520.000
bioloģija	Latvian	/	216.000	182.000
biologija	**Slovenian**	**10.800**	**178.000**	**238.000**
Heart attack	English	667.000	47.200.000	58.900.000
ataque al corazón	Spanish	/	4.130.000	5.350.00
Herzinfarkt	German	/	1.080.000	1.110.000
kalp krizi	Turkish	/	1.320.000	1.740.000
sirdslēkme	Latvian	/	51.300	65.600
srčni infarkt	**Slovenian**	**137**	**52.600**	**127.000**
Eustachian tube	English	10.600	806.000	332.000
trompa de Eustaquio	Spanish	/	30.400	118.000
Eustachi Röhre	German	/	8.070	11.300
östaki borusu	Turkish	/	11.700	58.000
eistāhija kanāla	Latvian	/	5.220	6.230
evstahijeva cev	**Slovenian**	**5**	**5.430**	**7.670**

With more than 400 million internet users (Miniwatts Marketing Group, 2009) the Chinese would be very interesting language to be included in our research. In that case Google would not be the appropriate searching tool to use, because the problems with government and major language problems would be even harder to overcome.

Language-independent Computer Simulations

Two different language-independent simulations were developed. In the simulation with the title Osmosis we simulated a cell, which was in the computer supported work made out of plastic tube. We put that cell into different osmotic solutions, with different quantity of salt (NaCl): isotonic, hypotonic and hypertonic. The central part of the simulation was the passive movement of the water (solvent) through a semipermeable membrane and not the ions. In the second simulation we examined the impact of greenhouse gases on the heating of the atmosphere.

Osmosis

The process of osmosis was presented as the natural process in two variations: graphically and as an animation. One of the reasons why we created simulations is the attractiveness for the students that are learning biology. The simulation vividly presents to its user what impact does the process have on the cell (in our research only plant cells were used). The cell can be presented in three different environments (isotonic, hypotonic, hypertonic), which has to be chosen by the user from the menu on the right. Dependent on which solution is chosen, the impact on the cell varies. If the checkbox "show graph" is checked, the animation is also demonstrated with it. If the user chooses the first option among the solutions, the cell does not change a lot, because in the isotonic solution the water enters and leaves the cell in the almost same quantity – the graph stays linear. If the user chooses the second option – a hypotonic solution – the simulation shows how the vacuole increases; the graph is falling. The third option that can be selected is a hypertonic solution where the water leaves the cell; the curve on the graph rises (the graphs present the conductivity in the dependence of time). One of positive options of the animation is that the students can predict the result of the experiment without knowing the actual results. The hint is given through a key question, in the case of osmosis the students have to answer the question what passes into and out off the cell – solvent or solute. The addition to the original simulation is the option for translations in other languages. The menu can be reached with the button "Translate" and is built out of text inputs that enable the user to translate words into desired language (Figure 2). We also included the button to return to the basic language. This button serves as a safety tool, when user gets the program in a language that he/she does not understand or for example when a student inserts something unwanted into the text frames.
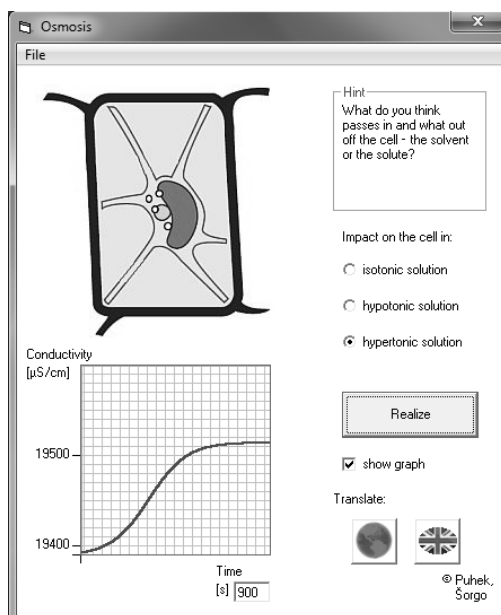
Figure 1: Basic view of the simulation Osmosis.　　**Figure 2:** Translated version of simulation Osmosis
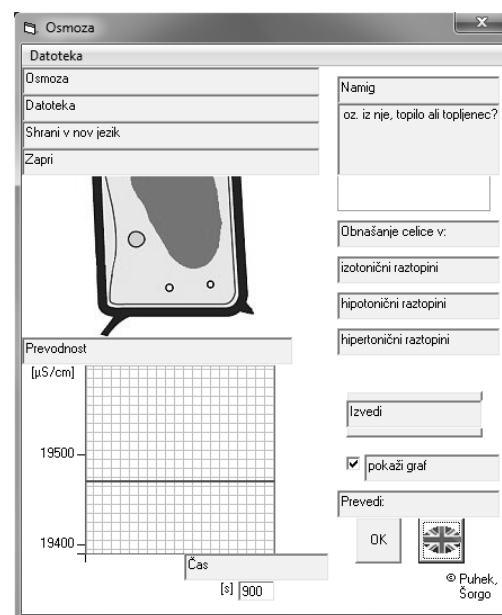
4

(target language: Slovenian).

The Greenhouse Effect

In the picture the arrows are used to present the heat that is produced by the radiation. The arrows are pointed to the Earth and into the sky, which simulates the radiation of the sun. In the simulation the user can choose between »normal state« and »greenhouse effect«. In the first option, the procedure is described, where the greenhouse effect is not present, which means that the optimal warmth on the Earth surface is preserved by letting some of the warmth created by the sun transmit back to the atmosphere. Temperature on the graph reaches around 35 °C. When the atmosphere is thickened by greenhouse gases (CO_2, methane, water steam) – this is simulated through an additional atmosphere layer – the sunrays cannot exit and therefore reflect back to the surface of the Earth. The curve on the graph shows 50 °C, the thermometer turns red. As it is the case in every simulation we created, the user can check the checkbox whether to show graph or not. The user can also use the hint to establish the point of the animation.

Again the part for translating into other languages can be reached with the button "Translate". The user can translate the words into desired language with changing words in the text inputs (Figure 2). We also included a button that enables the user to return the program to the basic language. Finally, simulation includes the menu for saving the program into the new, changed version.
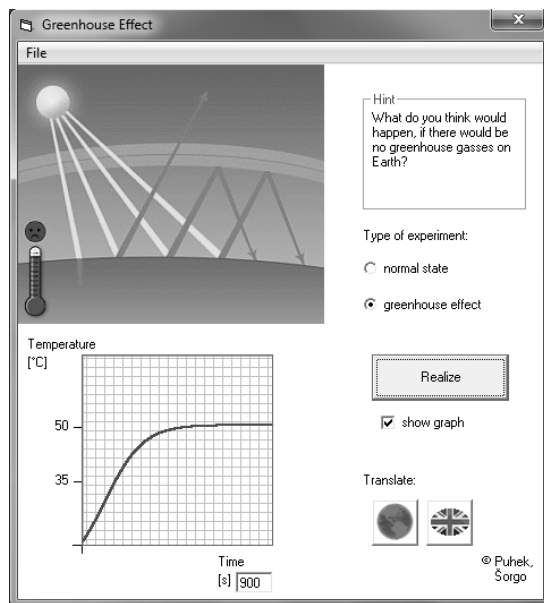
Figure 3: Basic view of the simulation Greenhouse effect.
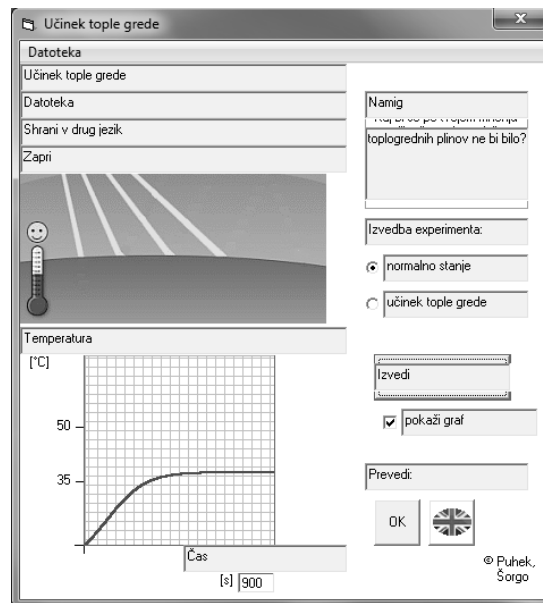
Figure 4: Translated version of simulation Greenhouse Effect (target language: Slovenian).

Conclusion and Recommendation

The main goal of our simulations was to create the included menu for translating into new languages. Despite previous versions (Puhek & Šorgo, 2009) we developed the menu for saving the changed version into the new one. The idea of our work is to develop a product that can be dispatched through the World Wide Web (or with other media like USB sticks) and can be used by everyone, especially by the users that can hardly find educational tools in their non-English languages. Despite some disadvantages of that procedure, as the fact that still somebody needs to know the basic language and translate it into desired one, we created an option for more users to use the simulations as if the simulations were only in English. Our simulations do not even need the internet connection, so they can run almost everywhere.

When the users translate the simulations and save them into the chosen language, pictures remain unchanged. That is why the simulations can be used even in multinational classes, because everybody can work with the didactical tools in the own language. For example in eastern part of Slovenia classes can be held in Slovenian and simultaneously in Hungarian. In that case the multilingual work depends from the abilities of the teacher and not from the didactical tools anymore.

In the future we would like to develop more simulations and test them in the classes around the world.

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EFFECTS OF AGRICULTURAL TRAINING ON THE ENVIRONMENTAL CONSCIOUSNESS LEVELS OF TURKISH CYPRIOT FARMERS

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Abstract: This study was conducted to determine the effects of agricultural trainings on the environmental consciousness levels of Turkish Cypriot (TC) farmers. For this reason, a survey was carried by interviewing stakeholders between February and June 2009. In total 200 stakeholders were interviewed where half of them got trained by the Agriculture Extension Service. The "New Environmental Paradigm", was revised according to the nature of the work and thus used in interviews to measure the environmental consciousness levels of TC farmers. Results indicated that 90% of the interviewed farmers were male, indicating the dominance of male farmers in TC agriculture sector. More than half of the farmers (69%) had at least a high school degree. An important result of this study is that, only 28% of the farmers are living with the income of farming and 44% works in another job. There was a significant difference between the trained and not-trained farmers' environmental consciousness levels. The average environmental consciousness percentages of the trained and not-trained TC farmers were determined 67.5% and 58.2%, respectively. The other important result of this study is that; the first preference of not-trained TC farmers in weed management is chemical methods where the first preference of trained farmers is mechanical methods. This clearly indicates the difference between the environmental consciousness levels of trained and not-trained TC farmers.

Keywords: Agriculture extension service; Turkish Cypriot farmers; environmental consciousness level; education

Introduction

Agriculture was the reason of transition from nomadic lifestyle to sedentary lifestyle around 9000 years ago. Since the beginning of agriculture, people started to produce their foods and the time leaved for hunting and gathering started to degrease and thus people use this remaining time for other things, such as: industry, social activities and etc. Therefore, it is clear that agriculture has a big influence on the development of civilization. On the other hand, faults in agricultural activities, caused collapsing in empires and states. Such as: the collapsing of Sumerian Empire in Mesopotamia was due to the decrease in the agricultural yield. The unconscious use of irrigation caused an increase in the water holding capacity and in turn, increase in the salinity caused a decrease in the yield and the Sumerian Empire was invaded by their neighbors: Acadian Empires (Hertsgaard, 2001). Therefore, environmental consciousness comes to the forefront of importance to ensure sustainability in agriculture and ecosystems.

Most benefits of the pesticides are based only on direct crop returns. However, excessive and continual use of agrochemicals has negatively affected agricultural production, reduced sustainability in agriculture, damaged the environment and caused human illness (Pimentel, Acquay, Biltonen, Rice, Silva, Nelson, et al., 1992). Although there are many pest control methods like cultural, physical, mechanical, thermal and biological, pesticides form the integral part of farmers' cultural programs because of agronomic/technical, sociologic and economic benefits. For example, numerous studies reported that satisfactory weed control can often be obtained when herbicides are used at doses below label recommendations (Steckel, Defelice & Sims, 1990; Vitta, Faccini & Nisensohn, 2000; Walker, Medd, Robinson & Cullis, 2002; Cheema, Jaffer & Khaliq, 2003; Barros, Basch & Carvalho, 2007;

Kahramanoğlu & Uygur, 2010). However, most of the farmers still do not take these researches into consideration. Not only the use of pesticides, but the use of soil, water and other environmental resources in agricultural practices can also directly affect environmental sustainability.

Agriculture and environment has a close relationship and interacts with each other in such a way that the health of agriculture depends on the proper functioning of environmental process (Conway, 1990). It has been found in different countries of the world that in addition to beneficial effect, the improved agricultural practices have also negative effects on ecosystems (Sattar, 1994). Thus, in turn, environmental problems such as: water pollution affects agricultural production. Environment problems are possible not only with technology and laws but also with the change of individual behaviours. The change of behaviours requires the change of attitude, knowledge and value judgements. It is only possible with an effective environmental education to form positive attitude, consciousness and value judgements to environment (Özer, 1991; Altın, Bacanlı & Yıldız, 2002).

In the sector of agriculture, universities and research facilities are generally engaged in research and teaching, but there is a gap between these facilities and farmers, which is an important reason of agriculture related problems. In developed countries, there are "agriculture extension services" which are aiming to provide consultancy service to farmers to improve their productivity, to increase income, and etc. These types of extension services are also under the control and protection of governments and thus these services help governments to control agricultural activities. In northern part of Cyprus, there have not been such services until 2008. In 2008, a project started by the EDGE "Economic Development and Growth for Enterprises" project (which is being implemented by BearingPoint Inc. and funded by USAID) which aimed to form an "agriculture extension service" in northern part of Cyprus. This service, taken up the responsibility of distributing agricultural knowledge, and put the emphasis on the synthesis of theory and practice and on promoting interactions between practical experiences and academic efforts in the field of agriculture. Main trainings of the Agriculture Extension Service are: integrated pest management, effective irrigation and fertilization, alternative crops, demands of international markets and GlobalGAP certification. This study aimed to measure the environmental consciousness levels of Turkish Cypriot farmers and evaluate the efficiency of the efforts of the Agriculture Extension Service (AES) by comparing the consciousness levels of farmers both trained and not-trained by the extension service.

Methodology

This study was conducted in northern part of Cyprus. Questionnaires were used to measure environmental consciousness levels of Turkish Cypriot (TC) farmers and the surveys conducted between February and June 2009. The surveys carried by interviewing with stakeholders. Interviewees indicated their response in 5-point scale where 1 represented strongly disagrees and 5 strongly agree or 1 represents the first preference and 5 represents the last preference. To be able to measure the environmental consciousness levels of farmers, the "New Environmental Paradigm (Dunlap, Van Liere, Merting & Jones, 2000), was also revised according to the nature of the work and thus used. First of all, 7 demographic (independent variable) and 35 deterministic questions (dependent variable) were prepared and practiced with 50 farmers. The Crobanch's Alpha of the items were determined as 0.689. The Kaiser-Mayer-Olkin (KMO) tests with the value of 0.81 revealed that the factor analysis is suitable for the questionnaire. All of the demographic factors got eigenvalues greater than 1.00 which makes them suitable for the universe of this study. 33 of the 35 deterministic items' eigenvalues were found to be more than 0.300. Two of the items which's eigenvalues were smaller than 0.300 were taken out from the questionnaires. Thus surveys were conducted with 200 stakeholders by interviewing. Half of the stakeholders got trained by the Agriculture Extension Service (AES). This allowed evaluating the environmental consciousness levels of professionally trained and not-trained farmers. Crobanch's Alpha of the items were determined as 0.753. Survey data were analyzed using descriptive statistics. The scores for all the items were summed and averaged. SPSS for Windows was used for data analysis. The independent variables of this study were: age, sex, level of education, region, income, share of farming, and level of professional training (by AES). All these variables were

9

measured by computing appropriate score and variance statistical measures such as mean, percentage, standard deviation. The data of this study was normally distributed and thus t-test was used in determining the relationship between level of professional training and their environmental consciousness levels. Five percent (0.05) level of probability was used to reject any null hypothesis.

Findings and Discussion

Results indicated that 90% of the interviewed farmers were male. This is one of the important results of this study where it indicates the dominance of male farmers in Turkish Cypriot's agriculture sector. The un-equality of distribution in the sex made it un-possible to compare the environmental consciousness levels of TC farmers in terms of difference in sex. Table 1 indicates that, more than half of the farmers had at least a high school degree. It is also clear in the Table 1 that, the farmers who got trained by the AES team are more educated than the others. This indicates that educated people are more aware of the importance of "information" and they are asking training to AES. This also indicates that AES team needs to give much attention on the training of less educated farmers. 6% of the farmers, who trained by AES, were also graduated agricultural engineers and only 2% of the not-trained farmers were agricultural engineers.

Table 1. Education levels of the Turkish Cypriot (TC) farmers

Level of Education	Percent (%) distribution		
	Trained by AES	Not-trained by AES	Overall
Illiterate	0%	4%	2%
Literate (non-graduate)	4%	8%	6%
Primary school	6%	8%	7%
Secondary school	12%	20%	16%
High School	40%	36%	38%
Undergraduate	30%	20%	25%
Post-graduate	8%	4%	6%

The other important result of this study is that, farming is not the only occupation for most of the farmers (Table 2). Because of the socio-economic structure of Turkish Cypriots, almost all of them (>18) have average 2-3 da agricultural areas. Some of these people do not want to loose these agricultural areas and rents to someone. Therefore, other people present themselves as a farmer. Actually, most of these people are not real farmers, but they use these areas and produce crops. Therefore, most of the people in northern part of Cyprus, who present themselves as farmers, are also need to have another occupation to survive. In this study, this ratio was determined as 44%.

Turkish Cypriot farmers were asked to respond 8 different scenarios about environmental problems.

Table 2. Share of farming of the farmers in their job occupation

Share of Farming	Percent (%) distribution		
	Trained by AES	Not-trained by AES	Overall
Only farmer	32%	24%	28%
Farmer with another job	48%	40%	44%
Helping family in farming	0%	16%	8%
Farming as hobby	12%	0%	6%
Other	8%	20%	14%

The scenarios, listed in Table 3, were expected to have a high score by the farmers. The results are little satisfied where all had an average more than 3. However, surprisingly, such scenarios about poverty, hunger and petroleum had the lowest scores. In most of the developing and

underdeveloped countries, farmers are among the poor citizens and they put more attention on the prevention of poverty and hunger. This could be because of: farming is not the only occupations of the farmers in northern part of Cyprus. When comparing the trained and not-trained TC farmers, it is clear in Table 7 that trained farmers give much score to all scenarios than not-trained farmers and in 5 out of 8 scenarios there are significant differences.

Table 3. Responses of the Turkish Cypriot (TC) farmers on some environmental scenarios on 5-point likert scale (1: strongly disagree.. 5: strongly agree)

If human activities continue as it is?	Mean		Sig. (2-tailed) value	Overall Mean
	Trained by AES	Not-trained by AES		
Climate will change and global warming will occur	4.60	3.68	0.001*	4.14
Poverty and hunger will increase	3.56	3.12	0.137	3.34
Petroleum products will decrease	3.08	3.04	0.906	3.06
Water quality will decrease and become expensive	4.48	3.40	0.004*	3.94
The importance of "Good Agricultural Practices" will increase	4.48	3.16	0.001*	3.82
Desertification will increase	4.56	3.68	0.001*	4.12
Disagreements (like war) will happen for natural resources	4.04	3.16	0.015*	3.60
Coast towns will be destroyed by the water from glacier melting	4.20	4.08	0.166	4.02

Values followed by * indicates significantly difference between trained and not-trained farmers' responses at a 5% level (t-test for equality of means)

The responses of the TC farmers on the modified "New environmental Paradigm" scenarios were given in Table 4. There are 9 scenarios where score "1" expected and 5 scenarios where score "5" expected. It is clear in the Table 4 that the TC farmers who trained by Agriculture Extension Service had a high environmental conscious level than the others. The responses of the TC farmers on the scenario of "agricultural areas are natural heritages and human beings can not use them according to their wishes" where score "5" was expected, the overall mean score was 3.40, which is slightly above "3". Some other scenarios also had not got the expected score. For the scenarios, where score "5" was expected, the score of trained and not-trained TC farmers were determined as 3.95 and 3.60, respectively. Günden and Miran (2008) reported that the environmental consciousness levels of the farmers in Torbalı district, Izmir/Turkey is 3.62. The not-trained TC farmers' score is close to the score of farmers in Torbalı/Turkey. For rest of the scenarios, where score "1" was expected, the score of trained and not-trained TC farmers were determined as 2.20 and 2.78, respectively. When the scores of scenarios where "1" was expected, were extracted from "5" to obtain all scores in same way, average scores for environmental consciousness levels of trained and not-trained TC farmers were determined as 3.38 and 2.91 respectively. By translating these scores into percentages, it can be concluded that the environmental consciousness levels of the trained and not-trained TC farmers were 67.5% and 58.2%, respectively.

Table 4: Responses of the Turkish Cypriot (TC) farmers on modified "New Environmental Paradigm" scenarios on 5-point likert scale (1: strongly disagree.. 5: strongly agree)

Scenarios	Mean		Sig. (2-tailed) value	Overall Mean
	Trained by AES	Not-trained by AES		
Natural heritage are the common heritage of humanity. Therefore, one can use, if pays (1)	1.60	2.68	0.004*	2.14
There is no desertification problem in Mediterranean basin (1)	2.20	2.24	0.891	2.22
Agricultural areas are natural heritages and human beings can not use them according to their wishes (5)	3.68	3.12	0.058*	3.40
Human beings can do changes in natural environments to meet their needs (1)	2.52	2.96	0.265	2.74
Interference of human beings on the nature produces disasters (5)	4.32	3.68	0.015*	4.00
Earth provides everything people need (5)	2.52	3.24	0.015*	2.88
Nature is strong enough to overcome problems developed by industries (1)	2.48	3.08	0.103	2.78
When economic benefit from natural resources are concerned priority, protection of the resources is the second phase (1)	1.84	2.40	0.071*	2.12
Countries may have socio-economic problems more crucial than environmental problems. And, solving socio-economic problems must be given priority (1)	2.64	3.64	0.005*	3.14
There must be equality between generations regarding to sustainable development principles and an unspoilt and protected environment must be hand on to future generations (5)	4.68	3.96	0.008*	4.32
The use and protection of natural resources can not be together (1)	1.88	2.56	0.026*	2.22
Plants and animals have the rights to live as human beings (5)	4.64	4.08	0.022*	4.36
Environmental problems are exaggerated (1)	2.36	3.08	0.034*	2.72
If human activities continue as it is, human beings will be faced with an ecological disaster (5)	3.84	3.52	0.195	3.68
Agro-chemicals have no negative effects on the environment (1)	2.24	2.36	0.731	2.30

Values followed by * indicates significantly difference between trained and not-trained farmers' responses at a 5% level (t-test for equality of means). Score in paranthesis () refers to the expectation of the responses

Weed management strategies are important elements for measuring environmental consciousness levels. Table 5 shows the sequence of preferences of TC farmers about weed management. Trained TC farmers mentioned that they firstly prefer mechanical control strategies, followed by preventing weeds and chemical controls. Since Pimentel et al. (1992) reported that excessive and continuous use of agrochemicals has damaged the environment, the not-trained TC farmers need to be trained to reduce the use of agrochemicals. It is clear that trained TC farmers have a high environmental consciousness level than the not-trained farmers. On the other hand, Zoschke (1994) reported that; although there are many weed control methods like cultural, physical,

12

mechanical, thermal and biological, herbicides form the integral part of farmers' cultural programs because of agronomic/technical, sociologic and economic benefits. Herbicides forcefully assist to maintain and secure yield (Kudsk & Streibig, 2003) and this is the reason of using chemical methods in agriculture. However, to be able to ensure the herbicides to remain an effective tool to farmers in the future, farmers need to optimize the use of chemical methods by incorporating with other methods, such as mechanical. From an environmental perspective, chemical control methods would be the last method for weed management but unfortunately not-trained TC farmers mentioned chemical control as the first method.

Table 5. Sequence of preferences of Turkish Cypriot (TC) farmers about weed management (1: first preference.. 5: last preference)

Weed management methods	Mean		Sig. (2-tailed) value	Overall Mean
	Trained by AES	Not-trained by AES		
Mechanical control	1.72	2.24	0.071	1.98
Chemical control	3.08	1.76	0.001*	2.42
Physical control	3.52	2.84	0.009*	3.18
Preventing weeds	2.96	3.88	0.032*	3.42
Biological control	3.72	4.28	0.054	4.00

Values followed by * indicates significantly difference between trained and not-trained farmers' responses at a 5% level (t-test for equality of means)

Last but not least observation of this study is the consultation preferences of TC farmers (Table 6). The farmers, who got trained by AES, are firstly asking consultation to agricultural engineers, followed by pesticide shops and neighbor producers and the not-trained TC farmers are firstly asking consultation to pesticide shops and followed by neighbor producers and agricultural engineers. In developed countries, pesticide shops are not allowed to consult farmers, where farmers can only buy pesticides or chemical fertilizers with a recipe given by authorized consulting services. In this case, these results, where consultants and providers are same, are so serious. The other important result is the condition of Ministry of Agriculture and it needs to be studied carefully and evaluated by the responsible authorities.

Table 6. Sequence of consultation preferences of Turkish Cypriot (TC) farmers about agricultural problems (pest management, irrigation schedule, fertilization programme and etc.) (1: first preference.. 5: last preference)

Weed management methods	Mean		Sig. (2-tailed) value	Overall Mean
	Trained by AES	Not-trained by AES		
Pesticide shops	2.48	2.08	0.090	2.28
Agricultural engineers	1.84	3.00	0.003*	2.42
Neighbor producers	2.68	2.52	0.614	2.60
Ministry of Agriculture	3.88	3.12	0.073	3.50
Friends and acquaintances	4.12	4.28	0.620	4.20

Values followed by * indicates significantly difference between trained and not-trained farmers' responses at a 5% level (t-test for equality of means)

Conclusion and Recommendation

The findings revealed that Turkish Cypriot farmers who trained by the Agriculture Extension Service had high environmental conscious level than the not-trained TC farmers, determined as 3.38 and 2.91 respectively. The results concluded that the environmental consciousness levels of the trained and not-trained TC farmers were 67.5% and 58.2%, respectively. According to the results of this study,

13

"education" and "extension services" came to the forefront of importance and stakeholders need to re-think about them.

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15

MULTILINGUAL LEARNING ENVIRONMENT IN FRENCH AND GERMAN LANGUAGE TEACHING DEPARTMENTS

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Abstract: The objective of the present paper is to shed light on multilingual learning environment in French and German language teaching departments in Turkish universities. The students in these departments are mostly the ones that take university entrance exam, national baccalaureate, and a test in English. They start to learn French and/or German using Turkish. In our study, we suggest that they can acquire these languages by means of using their first foreign language, English, which has typological (syntactical and lexical) similarities instead of using Turkish, which is not of the same family of languages. It is found that using English to teach French/German, therefore, instead of Turkish as a medium of communication in the class, creates a multilingual learning environment, which facilitates vocabulary learning, maintains input permanence, help think and act in that language due to typological features. As shortcomings, it is indicated that false-friends and teachers' lack of English are obstacles to create a multilingual learning environment.

Keywords: Multilingualism, Third Language, Language Integrated Learning, Language Acquisition

Introduction

The effect of globalization is today deeply felt in many areas from politics to education especially when it comes to linguistic studies for language is one's identity which man exposes and speaks within a limited space. While this globalization is ending the frontiers, multilingualism is becoming more and more common. In education, the focus of the researches on multilingualism is how to develop curriculum in a multilingual teaching environment, how to teach languages in multilingual context and how content and language integrated learning atmosphere can be built. So, competence in one language is no more desirable and being proficient in some of the most widely spoken languages is required to get a well-paid job. The phenomenon, multilingualism, is not novel in the federal or multicultural countries but it is so in nation-states where one language is legally required and respected in education. These countries regard multilingual education as a threat to their constitutional structures while multilingualism is overly considered by most European countries to be a crucial part of the union and therefore to be spread all over Europe.

With the advent of content and language integrated learning model (CLIL), foreign languages other than mother tongue are taught easily and without any waste of time. The aim of this type of learning is to teach a subject, for instance, mathematics in a foreign language and this will make it possible to teach that foreign language together with mathematics, which will gain the teacher a lot of time and energy. In this model, the content, let's say, is mathematics and the language is not the mother tongue assuming it to be French. The goal is to economize the expenses of a teacher and hire a teacher that can teach subjects, French and mathematics in the example above. This way, the student gets immersed in an environment where foreign language integrated into the content is dominant. In this case, teachers are required to be competent in both language and subject he is to teach.

In addition, in the countries like Canada to which there is quite much immigration, there exist a number of students of different origins and backgrounds in a class. Their mother tongues are all

different from each other. They strive to understand and learn the language and culture of the country where they are in. In this case, a CLIL environment is needed. The aim of this paper is to create a learning environment where French is taught by means of English which Turkish students in the department of French and German Language Teaching acquire for several years. Due to the similarities and cross-linguistic influence of French, German and English, we think that French and German can best be taught through English, which we assume to be a medium of instruction.

Multilingualism and Cross-Linguistic Studies

Multilingualism and multilingual acquisition are widespread and not only in officially recognized bilingual and multilingual communities but all over the world. Multilingualism means having a competence of two or more than two languages. Bilingualism is therefore seen as multilingualism. According to double monolingualism hypothesis, Herdina and Jessner (2002) regard bilingualism is as the sum of two monolinguals in one person with two separate language competences or in other words, bilinguals being regarded as two monolinguals in one person. Cenoz and Genesee (1998) have the prevailing concept that multilingualism and multilingual acquisition are complex phenomena because they can occur simultaneously or successively, formally (through instruction) or naturally (outside school) and in childhood, adolescence, or adulthood.

Learning an additional language after mother tongue is very easy for those who already know a second language than for monolinguals. In other words, there is positive transfer from second language learning to learning additional languages especially when the relevant languages are cognate and when there are similarities between these languages. In the case of English, French and German, three Indo-European languages, we see a lot of lexical and syntactical similarities which result in positive cross-linguistic transfers. Möhle (1989) and Singleton (1987) confirm that there is evidence for cross-linguistic transfer in multilingual acquisition when the languages involved are similar with respect to phonetic structure, vocabulary and syntax. For example, learners of French and English who have already acquired a non-Indo-European first language (in our case, Turkish is the first language of those studying in the department of French and German Language Teaching) tend to transfer vocabulary and structures from other Indo-European languages they know rather than from their first language (Ahukanna et al., 1981; Ringbom, 1987; Singh & Carroll, 1979). On the other hand, positive cross-linguistic influences have been found in the study of Hammarberg and Williams (1993) conducting a longitudinal study of the acquisition of Swedish as a third language by a native speaker of English who was also proficient in German and could speak some French. They observed cross-linguistic influence from English, German, and French when acquiring Swedish without formal instruction.

As clearly seen above, cognate languages are learned easily notably when the similarities and positive transfers from one language to another are considered to be influential and contributive factors in the acquisition of a new foreign language. In French and German Language Teaching departments, the students try to acquire these languages after passing the national baccalaureate exam generally in English. They get a year of preparation for learning the basic of these languages. The more they are involved in the novel language, the more lexical, syntactical similarities they recognize between English they have already acquired and French/German they are to learn in order to become teachers. After their bachelor degree studies, they strive to become multilingual and this multilingualism is formed very hard because of the lack of methodology and teacher's insufficient competence in the other foreign language. This language is generally English. In multilingualism whereby the students of French and German are third language learners, Ringbom (2001) and De Angelis and Selinker (2001) state that L2 status plays a crucial role in the third language acquisition like the role the first language plays in second language. It is widely known that under specific conditions being bilingual can have tremendous advantages, not only in terms of linguistic competence but also in terms of cognitive and social development (Jessner, 2006). The languages already acquired can have roles in the acquisition of a third language (Williams & Hammarberg 1998; Hammarberg 2001). Bilinguals learn a third language better than the monolinguals as the former

already know how to learn a language while the latter encounter problems during the acquisition of a third language. A monolingual is not experienced with learning a language other than his first language while a bilingual has been subject to all kinds of difficulties during his second language acquisition. In multilingualism, Jessner (2006) states, proficiency in third language depends mostly on a dynamic model, which is made possible through a cumulative learning of languages ($L1+L2+Ln+CLIN+M=MP$ where $L1$ is mother tongue; $L2$ is second language; Ln is n number of languages; CLIN is cross linguistic interaction; M is multilingualism factor and MP is multilingual proficiency). As seen clearly above, it is important to recognize the similarities between the target language and already-learned language when it comes to learning a new language.

Content and Language Integrated Learning (CLIL) in French and German Language Teaching Departments

Due to temporal and economic reasons, a subject other than foreign language is taught in the intended foreign language rather than in mother tongue in the classroom environment. This kind of learning is realized based on the content but the instruction is made through a medium of foreign language. The students learn easily the subject and the language at the same time by means of this type of instruction. The general term of this learning is called Content and Language Integrated Learning (CLIL), which refers to educational settings where a language other than the students' mother tongue is used as medium of instruction (C.D. Puffer, 2007). A whole gamut of terms is in use internationally and nationally (e.g. Content-Based-Instruction (CBI), Bilingual Teaching, Dual Language Programs, English Across the Curriculum). This type of teaching has been going on for several decades in most parts of Europe except in Lithuania, Malta, Portugal, Scandinavian countries. With the unification of European countries, Europe is becoming more and more multilingual and linguistic diversity in European countries is respected therefore it become preponderant to create at least bilingual teaching environments. In Europe, while this teaching environment is found mostly on high school or primary school level, it is very hard to observe a multilingual teaching atmosphere at universities.

In Turkey, as most students get into French and German Language Teaching departments with the score from their English test, we think that it is possible to teach them one of these foreign languages with the help of English instead of Turkish, which has no commonality with any of these Indo-European languages. In this case, CLIL methodology plays a key role in teaching foreign languages to those already bilingual. CLIL is widely applied in Canada, a bilingual country especially for those who have just arrived in the country and have been trying to integrate into a bilingual community. We can consider our students in these departments bilingual like those in Canada.

Demographic developments, which have transformed European societies into communities that receive immigrants rather than dispatch emigrants, have begun to undermine the understanding of CLIL, as has the political aim of European integration, embodied in the institutions of the European Union and the Council of Europe. The term CLIL covers a wide range of educational practices and settings whose common denominator is that a non-L1 is used in classes (e.g. Snow 1998). In CLIL education, most reasonable thing to do is to find a reservoir of concepts, topics and meaning which can become the object of 'real communication' where natural use of the target language is possible. In this respect, CLIL is the ultimate dream of Communicative Language Teaching (e.g. Brumfit and Johnson 1979) and Task-Based Learning (e.g. Willis 1996) rolled into one: there is no need to design individual tasks in order to foster goal-directed linguistic activity with a focus on meaning above form, since CLIL itself is one huge task which ensures the use of the foreign language for 'authentic communication'. In European context at least, CLIL classrooms are widely seen as a kind of language bath which encourages naturalistic language learning and enhances the development of communicative competence. In other words, CLIL classrooms are seen as environments which

provide opportunities for becoming multilingual and for learning through acquisition rather than through explicit teaching. As CLIL is not based on grammar and vocabulary teaching, it brings an end to the traditional teaching and brings about a way of teaching based on communication.

All in all, we can take into consideration CLIL as today's one of the best way of teaching methods as it is mostly based on practice and communication. CLIL can therefore be applied in language classes, where students already know a language which is close to the target language. In Turkey, notably French and German are taught through Turkish, mother tongue and by means of a method based mostly on grammar and vocabulary. The students are not deeply immersed in the target language. As a result, when they graduate, they rarely express themselves in that language and find jobs easily. With Life Long Learning programs supported by European Council, the students are encouraged to apply CLIL in the classes. This is especially obvious in Comenius program, a program for students of educational sciences, who have a score of 60 in national foreign language exams such as KPDS or UDS. When they get this score, they can teach their own field of study in that language in a school in Europe for 3-6 months. So, it is possible to teach French and German in the departments of French and German Language Teaching with CLIL at the university.

As for the shortcomings of this method applied in French and German Teaching departments, the teachers must have double features. First, they should have linguistic, pedagogical, methodological competence and second, they should have non-linguistic knowledge in teaching. In our case, teachers are good at education and methodology but they lack of English to find similarities and teach French/German comparatively. Proponents of CLIL actually confess to a hidden agenda in this respect: they want to stimulate language awareness as such via teaching in the foreign language. In addition, the learners can be culturally integrated with both languages and have the opportunity to compare and learn better foreign culture and their own cultures alike as long as the sources of languages involved are bilingual and the teacher is capable of teaching both. In French and German Language Teaching Departments, due to the similarities of the languages concerned, the students are easily motivated, learn quicker and better, practice more and interact with other students.

Multilingual Education and Teacher Competencies

Multilingualism is defined as the ability to use and impose knowledge of more than one language. Multilingual education, on the other hand, is made either in a class composing of students whose first languages are all different from each other or in a class where several languages are employed. Today, in the departments of foreign languages, bilingual education is done and the languages consist of the mother tongue of the learners and the target language. For the last two decades, multilingual education has been given an important role in developing language competencies.

An ideal teacher for the twenty-first century is expected to have knowledge of the discipline, the capability to employ a variety of pedagogical methods, communicative effectiveness in the classroom, the ability to develop materials, the ability to design and implement instruments for assessment and evaluation, aptitude for community relations and use of educational technology and motivation while a language teacher of multilingual teacher preparation even in computer-assisted instruction should have language proficiency in both the target language (languages) as well as the learner's language, knowledge of linguistics and multilingualism, an appreciation of the learner's culture and the ability to respond positively to the diversity of behavior in cross-cultural (multicultural) circumstances, competence in a range of instructional methods including appropriate collaborative work, the ability to utilize and adapt curriculum and develop materials, the ability to design assessment procedures for both self and learners, skills in the effective handling of school community relations, demonstration competencies in supervised classroom experience (D. Nunan, A. Lam, 1998). Among the competencies of language teacher mentioned above comes the language proficiency in the first place. To be able to implement an effective multilingual teaching, teacher is to be competent in both languages (learner's first language and second language(s)).

Findings and Discussion

Education in multilingual environment is becoming more and more tenable especially in Europe and Canada. As is widely known, Canada is a bilingual country where multilingual education is commonly done in classes of different ethnicities. Europe and Canada are two of the countries where there is a diversity of immigrants for whom multilingual learning environment is created. An increasing number of multilingual teachers are needed to teach courses in a language spoken and understood by each learner. Today, CLIL model is generally used in European classrooms to teach the target language and the content. CLIL is also the model where language assistants in Comenius program are supposed to use during their traineeship in schools.

It is clear that similarities and positive transfers help create a multilingual learning environment where French and German are taught through a medium of instruction in English, our learners' first foreign language. The fact that teachers of these languages lack of knowledge of the latter and that the sources used to teach these languages are not bilingual, that the students are not subject to multilingual atmosphere where they could practice these languages are some of the deficiencies that could be mentioned. On the other hand, teacher's insufficiency to make comparison of the target language with the source language, to motivate learners by showing the easy aspect of learning a new language, his inability to respond positively to the diversity of behavior in cross-cultural circumstances, his insufficient knowledge of the other cultures can be regarded as in some way the shortcomings of this learning model.

Consequently, in this paper, we suggest that in French and German Language Teaching departments, content and language integrated learning model can be applied; as a source language, instead of Turkish, English, which has a lot of commonalities with the target languages, French and German, should be used by a teacher aware of the similarities to make a comparative teaching. In addition, sources should be prepared in both English and the target language. If these conditions are implemented, a better teaching of these target languages is possible. Moreover, false friends should be taken into consideration and explained to the learners during teaching these languages.

Conclusion and Recommendation

Today, there exist many different languages taught at schools and it is quite easy for a European citizen to learn English, French or German, which are three most important and widely spoken languages at schools just as the Turkish learn easily Uzbek, Azeri or Kazakh. The languages of the same family are easily learned just because these languages have common words and syntactical structures.

In Turkey, as most students in French and German departments learn English as the first foreign language at school, they become already familiar with the former which are cognate with English. Therefore, they do not waste any time with understanding the common structures of these languages and learn easily as long as they receive the right instruction and method. On the contrary, the students who already master English start to learn French/German as if they became knowledgeable about a language of Indo-European family of languages. Seeing the differences and similarities between their first and second foreign languages is an advantage while not receiving the right method to access to their new languages is an obstacle. To be able to improve and save time for learning new languages, they need to get the best instructions as much as possible.

For a better and easy learning of new languages that are cognate, learners should find and understand commonalities and differences of these languages while they are instructed comparing these cognate languages in the class. Content and language integrated learning method must be used in the classes instead of traditional grammar and translation method. They should be able to reach the

20

sources in English and French/German instead of Turkish, their mother tongue. After graduation, they should be able to find opportunities to practice and deeply understand the culture of the languages they learn either by themselves or by participating in the Comenius projects funded by European Commission, which is a lifelong learning program for foreign language learners who are supposed to become foreign language teachers at school.

Finally, foreign language learners should be exposed to the languages they are learning not only in terms of grammatical structures but also in terms of cultural entities and country features of those languages while teachers of these languages should be able to express themselves in English when they are teaching French or German. They make use of sources in both languages and make a comparative instruction, which is more retentive than rote-learning style. On the other hand, classrooms should be designed in two languages where there should be documents, posters, papers or photos that have signs in two languages. Only in this case can we create a multilingual learning environment for the students of French and German.

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POSITIONAL "INFERIORITY": A POSTCOLONIAL ANALYSIS OF THE EXPERIENCE OF JAMAICAN TEACHERS' COLLEGE FACULTY

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Abstract: This paper examines the attitude towards teacher education in Jamaica particularly in relation to institutions which have their roots in the normal school system established during the immediate post-slavery/classical colonial era. This analysis is based on data from a larger phenomenological study on the experience of 17 teacher educators from 5 of the 6 teachers' colleges in Jamaica. Using a postcolonial studies theoretical frame, the educators' experiences were examined for deeper meanings and connections to the country's history of slavery and colonialism. Based on this examination the researcher concludes that there are profound entrenched colonial impositions and retentions that continue to undermine the status of Jamaican teachers' colleges as legitimate tertiary institutions.

Introduction

It is well established that former colonial societies, largely categorized as the Third World, are still affected by negative retentions of their colonial past. The education system in these states is arguably one of the most impacted in this regard. Jamaica provides an important context for this study in light of its dual or two-tiered system of education which evolved from slavery and colonialism. Since teacher training is such a pivotal component of the teaching services, it is a key point of entry to gain a deeper understanding of the effects of colonialism on educational institutions, structures and processes. As practitioners in the trenches of teacher education, the lived experiences of Jamaican teacher educators who work in teachers' colleges provide a vivid and enlightening view of the Jamaican reality. Examined through postcolonial theoretical lens, the educators' powerful testimonies confirmed as well as revealed troubling issues that are reminiscent of a past characterized by British domination, subordination and cultural devaluation. The disregard for teacher educators' grounded knowledge, the lack of material support for teacher education, and the undervaluing and under-rewarding of the services of teachers' college faculty exemplify the plight of teacher education in Jamaica.

The context of teacher education in Jamaica

A two-tiered or dual[1] system of public education currently operates in a starkly socio-economically polarized Jamaica. On one hand, an elitist brand of education consisting of private elementary schools, traditional high schools[2], and the University of the West Indies (UWI) largely serve the middle and upper classes. On the other hand, a largely under-supported and under-regarded system consisting of public elementary schools, upgraded secondary schools, and teachers' colleges, serve predominantly the working class.

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[1] Philip Altbach and Gail Kelly (1978) posit the concept of 'dualism' as "a hallmark of colonial schools." According to Altbach and Kelly, dualism is "the existence of two distinct school systems in the colonies that were controlled by the colonizer – that for the colonizer himself and that for the colonized" (p. 7). The researcher finds that the term "dualism" parallels the use of 'two-tiered' to describe what currently obtains in the Jamaican education system as a result of our colonial legacy.

[2] Traditional high schools evolved from elementary schools that were established for whites during slavery.

23

This separatism in education and the positional inferiority[3] of teachers' colleges have roots in the development and purpose of teacher education in Jamaica. Prior to emancipation from slavery, whites in Jamaica recruited teachers from Britain to tutor their children, while blacks had little or no formal education. Although religious denominations made the initial step to train local teachers in 1832 (D'Oyley , 1979, p.10) it was not until emancipation and the attendant Negro Education Grant (NEG) that teacher training institutions (then referred to as *Normal Schools*) were officially established (Whyte, 1983). As was the case with elementary education, the religious denominations and the Mico Trust[4] implemented the first system of teacher education in Jamaica in 1836. The purpose of these institutions was to prepare black teachers to teach in the newly established public elementary schools. Because blacks were denied secondary schooling during the period, teacher education for them functioned effectively as a secondary institution (Miller, 1990) as well as the primary route for upward social mobility.

During the colonial period, teacher education curricula strongly reflected the largely disempowering nature of education for blacks. As was the case at the elementary level, the teacher education program heavily emphasized religious and agricultural studies. From one angle, the religious groups were on a fervent campaign to use teaching as a vehicle to promote their doctrinal agenda. From another angle, the government, reflecting the colonizers' general view then that the place of blacks was in the 'field' of agriculture, insisted on the inclusion of agriculture in the training. The authorities at the Mico normal schools, however, represented a strong dissenting voice, arguing that the emphasis on 'agricultural studies' for example, was too similar to the recent slavery experience; hence they offered a more balanced curriculum. Although the Jamaican teachers' college curriculum today reflects current development and trends in teacher education, the content, to a significant extent, lacks local relevance, and relies heavily on foreign knowledge and scholarship.

Theoretical Frames
Postcolonial discourse

Postcolonial studies are a relatively recent ideological discourse and represent a critical response by the former colonized to the various forms and processes of Western domination and subjugation resulting from the colonial encounter. The evolving state of this theory is evident in the unstable use of the term *post-colonial* versus *postcolonial*. Some theorists use post-colonial to refer to conditions *after* or *post* colonialism (London, 2003), while others use postcolonial to mean the effects of colonialism since its inception to the present (Ashcroft, Griffiths, & Tiffin, 1998). In addition, you will find that in reference to this emerging critical theory, some interchangeably use both terms – *post-colonial* theory or *postcolonial* theory. To avoid any confusion of the terms in this study as well as based on the logic of the definitions given above, the researcher employs the form, "post-colonial" to mean after the event of colonialism; and "postcolonial" to refer to the discourse.

The colonial enterprise has left former colonies suffering from wounds which appear to deepen rather than heal. In virtually every aspect of their lives, former colonized people contend with the repercussions of their encounter with European colonizers. In response, postcolonial theorists engage in discussions about a host of experiences connected to slavery and colonialism such as suppression, resistance, representation, difference, race, gender, and social class. Within these broader themes, specific issues such as the primacy of the colonizer's language, religion, cultural histories, knowledge and other element of identity over that of the local people's, is topical in the postcolonial

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[3] I coin the term "positional inferiority" in juxtaposition to Edward Said's "positional superiority" where he describes the West's developing a view of themselves, and different positions of superiority in relation to Orientals or the Easterners.

[4] This trust was established through funds granted by Lady Mico, a British noble woman, to educate formerly enslaved individuals.

conversation. Postcolonial studies, therefore, is an academic space in which to contest hegemonic ideologies and impositions, which continue to oppress formerly colonized peoples who now inhabit what is called the 'developing world' (here after Third World or post-colonial societies).[5]

Postcolonial discourse is led by a host of passionate voices from different corners of the Third World who call attention to continued Western violence and domination. One prominent voice is *Edward Said* whose ground-breaking work *Orientalism* (1978) analyses how the West, through centuries of domination designates nations as 'the Other' – an entrenched characterization that distorts non-white identity, and relegate them to an inferior place in humanity. Said's concept of "positional superiority" is quite useful in the researcher's analysis and discussion of the two-tiered system of education in Jamaica, particularly the inferior status of teachers' college in relation to the University of the West Indies..

Phenomenology

Phenomenological research began in the early twentieth century as a philosophical movement but later gained traction as a powerful empirical methodology. Although influenced by the ideas of others before him, German philosopher Edmund Husserl is credited as the movement's founder. Husserl crafted a brand of this inquiry into what he called *transcendental phenomenology*. The general principle underlying this methodology is that researchers should do all that is possible to 'transcend' or remove personal notions and experiences of the phenomenon being studied, in order to ensure credibility of the process. This ideal is virtually a human impossibility, and that is perhaps why Martin Heidegger, Husserl's former student, advanced another perspective on the methodology. Heidegger's *hermeneutic phenomenology* presupposes some prior understanding of the phenomenon by the interpreter/researcher, and therefore inevitably brings that experience to the inquiry process. Heidegger, therefore, believes that the way to deal with this inevitability is that the researcher's 'baggage' be acknowledged, accounted for, and inform the process. In light of this principle, the researcher has, from the outset of this study, declared his interest in, and connections to the phenomenon to be investigated – the experience of Jamaican teachers' college lecturers. The researcher however, appreciated the delicate balance that had to be maintained in this study regarding his prejudices and the integrity of the research process.

Notwithstanding the philosophical and ideological differences between Husserl and Heidegger, both philosophers would agree that "Phenomenology aims at gaining a deeper understanding of the nature or meaning of our everyday experiences" (van Manen, 1990, p. 9). This statement therefore, illustrates the essential purpose of the methodology – which is to uncover the meaning of lived experiences. The phenomenological methodology therefore, provides critical value to the investigation as the researcher's primary focus is the interpretation or meaning that Jamaican teachers' college lecturers attach to their experience, as well as the deeper meanings that the themes derived from the findings revealed.

A primary mode of inquiry in phenomenological research is interviewing, and a powerful variant used in this study is *in-depth phenomenological interviewing*. This strategy features a three-interview structure formulated by Dolbeare and Schuman (Schuman, 1982) and further developed by Seidman (1998). In-depth phenomenological interviewing is a combination of life-history interviewing (Bertaux, 1981) and deep, focused interviewing informed by principles of phenomenology. Because of the nature and the fusion of these two foci, in-depth phenomenological interviewing is "a powerful way to gain insight into educational issues through understanding the experience[s] of the individuals whose lives constitute education" (Seidman, 1998, p. 7). Furthermore,

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[5] As part of the researcher's political stance in joining the postcolonial conversation, I will not use the term "developing" or "developed" in reference to countries. Instead, for the want of a better term, I will go with "Third Word" for less industrialized nations and "First World" for industrialized ones.

the two-way interaction inherent in the methodology provides a non-threatening environment where researcher and participants can share and explore the issues more extensively and openly. This technique allowed the researcher the opportunity to delve beyond the superficial layers of the phenomenon, enabling greater understanding of the essence that participants make of their experience, and the researcher of their experience in relation to the postcolonial context in which they practice.

Research Methodology

In this study the researcher explored (1) the experience of Jamaican teacher educators who work in the teachers' college system; (2) the meaning they make of that experience; and (3) whether there were connections between the meaning of the educators' experiences and the country's history of slavery and colonialism. The researcher's approach to this inquiry was to capture the professional experience of teachers' college lecturers through their personal stories and reflections by using an in-depth phenomenological interviewing methodology. Further, the researcher made sense of the educators' experiences by conducting a thematic analysis of their responses. Finally, the deeper meanings of the emergent themes were interpreted through a post-colonial theoretical framework. The following discussion provides rationales and greater details about the methodological decisions and processes.

Participant selection

The researcher intended to include twenty participants in this study but time limitation and other constraints restricted the number to seventeen – two more than the minimum target. Also, although the researcher desired to draw participants from all six teachers' colleges one was omitted because the faculty at that institution was engaged in a number of summer workshops and training programs and could not commit to all the interviews. With the exception of two cases, access to participants was gained largely through their peers, instead of through individuals in authority. The researcher took this approach as a first step in cultivating a sense of equity in the interviewing relationship; as well as to avoid giving the impression that the research was sanctioned by the administration. The researcher was very careful to eliminate or minimize any factor that could inhibit participants' willingness to share their experiences out of fear of possible repercussions.

Because the research site is Jamaica and the researcher was in the United States, an approach akin[6] to snowball sampling in the initial search for participants two months prior to the study, was pursued. Through colleagues and acquaintances who teach in the colleges, the researcher first obtained one lecturer's telephone in each college. Prospective participants were then contacted by telephone, at which time the researcher introduced himself as a colleague, briefed them about the topic and the interviewing process, and invited their participation. Next, the researcher asked them to suggest additional names, and provide telephone numbers of colleagues who fit the study criteria, and who they think could be approached for inclusion in the study. Upon receiving the details for the prospective recruits, they were contacted and the process was repeated. That process yielded ten participants. At that point the researcher arranged tentative dates for the interviews. The remaining participants were selected when the researcher arrived at the research sites (colleges) and personally approached lecturers in their respective departments.

The initial use of use of snowball sampling was the most practical technique in light of the researcher's lack of proximity to the research site. At the same time, using random sampling would be impractical as well as unnecessary in this kind of research as the object is not to apply strict generalization to the findings. That said, the in-depth interviewing process, however, requires a great degree of thoughtfulness in selecting participants who would provide information that captures the depth, richness and complexity of the educators' experience. An essential element of participant selection in a phenomenological study is that participants are experiencing the phenomenon

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[6] I say "akin" because I did not strictly follow the classic route of snowball sampling where the entire sample was selected through the technique.

(Moustakas, 1994). Individuals must be experiencing a phenomenon to be able to speak about it with currency, credibility and authority. Hence, Jamaican teachers college lecturers are more than qualified to talk about their experience in the context of teacher education in the Third World or post-colonial society.

Another crucial issue concerning participant selection in this study is the decision regarding characteristics of the educators to be included. There is no strict "in-advance criteria" for accomplishing this objective in the qualitative study (Moustakas, 1994). In addition to age and gender mentioned by Moustakas, the researcher gathered from a pilot study on the topic, that *location of teachers' college*; *years of service*; and *subject area* are important participant characteristics. Although the intent here was not about strict generalization, the inclusion of individuals from these different groups provided a reasonable spectrum of the educators' experience that was sufficient for thematic development regarding the phenomenon.

Data collection

In-depth phenomenological interviewing requires that three ninety-minute interviews be conducted with each participant, guided by three broad questions (See Seidman 1998, for a greater discussion on the general structure of such questions). The first interview addressed the question: *What was the life journey like for the participant before becoming a teacher educator?* The purpose of this question was to contextualize the participant's experience by asking him or her to share as much as possible about him or herself in relation to the topic, up to the time of becoming a teacher educator. The researcher also found that this initial interview was an important point of entry for participants' to share their experience as they were all enthused to reminisce about their childhood and paths to becoming teacher educators.

The second interview explored the question: *What is the participant's experience like being a teacher educator in Jamaica?* The focus of this interview was for the participant to share concrete details about his or her work experience as a teacher educator. Based on those constitutive elements of the educators' experience the researcher was able to better understand the essence of the opinions they expressed and the meanings they made of the experience.

And the third interview examined the question: *What does the experience of being a teacher educator mean to the participant?* This final interview was for the participant to reflect on his or her work and derive some essence from the experience with a view to providing an understanding of the connections between work and life – for example connections to his/her role in society or to personal wellbeing. In addition to exploring that basic question, in cases where time allowed the researcher asked participants to share any thoughts they had about the connection of their experience with Jamaica's history.

The interviews were audio-taped and transcribed verbatim. About half of the transcriptions were done by the researcher; the rest was completed by two competent typists. The researcher provided the typists a sample transcript and corresponding audio clip to study before they started. This was important to impress upon the typists the importance for the transcripts to be produced verbatim. Typing began as soon as the first interview was completed. In order to ensure accuracy as the typing progressed, the researcher compared samples of audio and the written texts produced by the typists. It was also important to protect participants' identity, so they were always referred to by pseudonyms in the interview, in conversation with the typists, and throughout this study. Additionally, the typists were required not to discuss the contents of the interviews with anyone.

Data analysis and presentation process

Managing and making sense of the interview data was a challenging aspect of the research process. This is largely so because the three-interview structure yields voluminous material and hence a critical decision is always to determine how much of the text one would include in the report and in what form. Three options of sharing the data are recommended by Seidman (1998): a profile of the

participant's story; vignettes of salient issues from the interview; or a thematic analysis of the material. A thematic analysis of the findings was judged by the researcher to be the most meaningful way of representing the multifaceted experiences of the 17 participants. Based on participants' articulation of their experience and the researcher's interpretation of how to organize the material in relation to the study's focus, the findings are presented according to three major topics and nine themes. In the discussion and analysis, however, the researcher focussed on six of those themes which he determined, situate more cogently in the postcolonial theoretical frame of this study.

The interview material was analyzed by following principles akin to the Grounded Theory method developed by Glaser and Strauss (See Charmaz, 1983, for further discussion on this method). Using a system of labeling or 'coding'[7], the researcher sorted and categorized the interview data to identify themes and topics which are pertinent to the topic. From the pilot study the researcher found that reading and rereading each interview and assigning labels was a useful approach to putting order to the participant's story. The researcher recognized how common labels or topics across participants may be organized thematically in order to give meaning to the participants' collective experiences, in relation to the research topic. Basically, the process of organizing and analyzing the data involved the following major steps: (A) labeling excerpts from the interview text; (B) developing themes and categories by identifying connecting threads and patterns among the excerpts; and (C) presenting and commenting on the categories and themes, particularly in relation to the focus of the study.

The process of reading and labeling the material from 90 ninety-minute interviews can be a daunting exercise; so in addition to using Microsoft Word-processing software to produce interview transcripts, a qualitative data 'analysis' software was also employed to facilitate greater management of the material. The researcher used the *Ethnograph 5.0* (Qualis Research, 2001) qualitative software which proved to be quite useful for organizing and reproducing data according to labels and themes. The *Ethnograph* allows the user to (a) create a project which is essentially the title of your study; (b) cut and paste each interview into the program editor and save (or file) according to the project's name; (c) label portions or excerpts from each interview as you choose; (d) store all labels which can be retrieved later to organize labeled excerpts from one interview or across all, which can be printed for closer analysis; and (e) write memos about passages and labels.

The findings are presented thematically, in relation to the research focus – the experience of Jamaican teachers' college lecturers. Although the report gained cohesiveness and structure through the researcher's comments, the first person was used report to ensure faithfulness to the participants' words by reporting their stories in their voice. The researcher however, removed idiosyncratic oral speech (e.g., uhm, ahm, yuh nuh,[8] etc), grammatical errors and the like, in order to make the text more readable. Also, in the cases where some Creole was used the researcher provides the English translations as best as possible. Essentially, final decisions about the selected material was made on the basis that justice is done to the participants and that the excerpts accurately reflect the interview as a whole or a "total experience" (Patton, 1990, p. 410). Finally, the researcher conducted a deeper analysis of the meaning that six of the nine themes revealed about the status of teacher education in Jamaica, specifically in light of postcolonial theory.

Results and Discussion

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[7] I avoided using the term 'code' or 'coding' as I consider it language inappropriate as well as unnecessary for qualitative research. Apart from the fact that I think the term suggests secrecy, I agree with Ian Dey (1996) that its generic meaning imposes a mechanical sense on the complexit5y of qualitative data analysis. I used the term 'labeling' or 'label' which is a simpler, more appropriate language for the unstructured nature of the interview material in this study.

[8] "Yuh nuh" is Creole for the English "You know" which tends to be a speech pattern of many Jamaicans.

The disregard for teacher educators' grounded knowledge

A key theme that distinctly emerged in this study is the need and desire for scholarly engagement among the majority of the participants. It is important to underscore here, that the primary work of training Jamaican teachers is done by teachers' college faculty. They are the people involved in the recruitment, instruction, supervision, assessment, and to some extent, the certification of prospective teachers. The point is, virtually no one else is so deeply engaged with, and likely to understand the complexities of teacher education in Jamaica better than teachers' college faculty. However, the experiences and insights teachers' college faculty gain from doing so, seem to be largely disregarded. The reality is, they are afforded very little opportunity to contribute to the scholarship on teacher education in Jamaica.

According to the findings of this study, all participants consider research to be a valuable exercise, and the majority feels that it should be a part of their responsibility. As summarized in this participant's remark, "Research is a worthwhile and beneficial effort, and we all as teacher educators should engage in it. Research findings could be the springboard for writing books, papers, as well as support for our teaching" (Carol). But as another participant points out:

> …Much more needs to be done by and for teachers' college [faculty] in terms of research. There is very little happening, and it's only the people from the University [of the West Indies] that keep producing. And that is so because their job tenure hinges on them producing material…And of course they are facilitated by sabbatical or whatever they call it. We don't have that kind of support… (Althea)

In spite of the desire among many participants to be engaged in research, teachers' college faculty are largely left out of this important academic activity.

While teachers' college faculty languish for support to engage in research, their "counterparts" at the UWI are encouraged and supported through various means to do so. For example, research is part of their job description; and they have sabbaticals, funding, and opportunities to share their work. Hence UWI faculty have greater opportunities to explore and generate knowledge pertaining to their field and their clientele. On the other hand, teachers' college faculty are neither required, nor provided opportunities, to generate scholarship in teacher education. In light of the differential treatment between the two types of tertiary institutions, the researcher was strongly convinced that the "field" knowledge and experiences of teachers' college faculty are not sufficiently regarded. The researcher was compelled, therefore, to examine what accounts for this attitude towards the educators' grounded knowledge.

The lack of regard for the grounded knowledge and experience of Jamaican teachers' college faculty, as seen through postcolonial critical lens, can be broadly characterized as a function of Western domination beginning with colonialism and perpetuated through neocolonialism. By neocolonialism, the researcher means that not only do former colonial powers continue to greatly influence knowledge transactions in former colonies, but former colonial subjects are performing self-flagellation through oppressive practices and attitudes akin to those of their former colonial masters. During the early expansion of their empires, the British and other imperial powers, systematically suppressed the knowledge bases of the local cultures they controlled, and subtly and aggressively supplanted it with theirs. Consequently, Western powers have largely succeeded in not only convincing their victims to think about themselves in inferior terms, but to disregard their own knowledge and knowledge systems.

This process of cultural domination and indoctrination largely took place through a transmission type educational system organized by the powers during the colonial era. Alas, the process surprisingly (or unsurprisingly) persists even today through an educational system that is now governed by the formerly colonized. The cultural domination continues to operate primarily through the same transmission paradigm, which, at its core, has very little regard for local insights and

experiences. As Dahlstrom, Swarts, & Zeichner (1999) observe: "This transmission perspective downgrades knowledge of practice and knowledge developed from practice and overemphasizes knowledge produced by 'experts' who are usually far away from reality" (p. 160). In the case of Jamaican teachers' college faculty, their grounded knowledge is disregarded (by others and themselves) in favor of 'expert' knowledge transmitted through foreign textbooks, as well as that from the scholarship of UWI faculty who in most cases, are less engaged than teachers' college faculty, with the day-to-day complexities of teacher education. A troubling question therefore, is how is this status quo maintained, with little or no effort even by teachers' college faculty themselves to alter or challenge it?

The answer to this question might reside in the fact that, the entrenchment of this insidious system as it obtains in Jamaica, is largely attributable to the disparate intent behind the established purpose of the teachers' college versus the UWI. Yes, both were conceived to facilitate the colonial enterprise, but at different levels: the UWI was designed to train the 'social elites' to perform the top functions of the colonial agenda; while the teachers' colleges' role was mainly to train individuals (i.e. teachers) to prepare the populace literate enough to carry out working class functions. Despite the fact that governance is now in the hands of descendants of the enslaved and colonized, it would seem that we have collected the baton and continued running with the imperial agenda. It is also troubling that the process seems to have largely conditioned teachers' college faculty to accept that an academic endeavor, like engaging research, is outside their professional scope, and hence defer to others at 'the top' – namely faculty from the UWI and other universities from the industrialized centers of the world. As a result, teachers' college faculty recline in a state of dependency – and are involved more in knowledge re-distribution rather than knowledge production. One participant was quite eloquent in recognizing this unproductive mode:

> …We don't seem to see teacher education as our full responsibility. We tend to leave research to the people at UWI…; and they then issue their findings to us. So we have a dependency syndrome – we seem to take comfort in the knowledge that somebody else is going to do it. And we are always there waiting with our out-stretched hand… (Frank).

This comment profoundly underscores the point that the possibilities of the Jamaican educational enterprise, therefore, are under-actualized because the intellectual potential of teacher educators is under-utilized. If teachers' college faculty were encouraged and supported to conduct research, as is the desire of many participants in this study, perhaps there would be locally derived theories and understanding on manifold topics such as: the benefits of the Creole language in teaching and learning, the impact of foreign textbooks on the development of identity and self-esteem, classroom predictors of crime and violence, to name a few. These are issues that attract much speculation by different interest groups in Jamaica and require deeper exploration and understanding. Little is done, however, to study them empirically. Teachers' college faculty could make a significant contribution in this regard because they are intimately involved in the classrooms: first by what they glean from new interns fresh from the schools, as well as through their supervisory interactions on the ground. These vantage points provide the educators tremendous opportunities to systematically gather, make sense of, document, and ultimately share their grounded knowledge. Unfortunately, this kind of research potential remains largely untapped, as there is little or no expressed political will to exploit this advantageous possibility. Consequently, the problems regarding paucity of local material, and the prevalence of foreign textbooks, highlighted in this study, remain largely unresolved.

The culture of keeping teachers' college faculty largely unpublished, also solidifies the process that keeps teachers' colleges as second rate tertiary institutions. It is well established that colleges and universities are likely to command more recognition when the ideas and work of their faculty members are publicized. Although teaching is just as valuable as research, it is not normally brought up for special public notice. It is important research findings that are more likely to place the

spotlight on an institution. Jamaican teachers' colleges now experience limited visibility outside the fact that they are the primary institutions that train the nation's teachers. On the other hand, the UWI has greater visibility in terms of its faculty's publication of scholarly material. This therefore, further strengthens their position as a legitimate tertiary institution, and confirms the opposite for teachers' colleges.

When post-colonial governments, like Jamaica, show little regard for teacher educators' grounded knowledge, they are inadvertently advancing the agenda of neocolonialism and neo-imperialism in their societies. In so doing, the dearth of local knowledge production remains, and the reliance on Western material for educating the populace is unabated. It must be recognized that empowering our educators to have a voice about their realities is imperative in post-colonial societies. It is a part of the process of affirming our humanity and identity in a world where former colonial powers continue to exert their aggression through knowledge control and domination. To prevent this dehumanizing aggression, Freire (1970) argued, it is a must for those who have been denied the right to speak, to first reclaim this right. And it is a part of the postcolonial worker's duty (teachers' college faculty included), as Mulenga (2001) argues, "…to reappropriate the writings of the 'Other' on the margin and rehabilitates their histories and perspectives *on their terms*, and push them to the center" (p. 448). Hence Jamaican teachers' college faculty must be provided real opportunities and support to participate in constructing knowledge that is for, and of the Jamaica experience.

The lack of material support for teacher education

Another disturbing issue that emerged from this research is the lack of material support for the work of educators in Jamaican teachers' colleges. The participants in this study relate a dismal story in relation to access, availability, and quality of instructional materials and facilities available to them. For example, they describe teachers' college libraries as not only deplorably inadequate, but noted that much of the printed material lack local currency. According to one participant, "We do not have enough material to support the program. We need more books, more journals and in particular, more up-to-date material" (Carol). Another participant agrees by stating: "Sometimes when I am writing up my bibliography to give my students I am embarrassed by the age of the books in the library that I am recommending" (Beverly). And according to many participants, the issue goes beyond scarcity and dated text. They observe that even in the case where material is available, much of it lacks cultural significance. The two accounts below underscore that sentiment:

> … [Although] Caribbean people have written a number of social studies books [and] a number of papers on social issues…most of our source materials have been prepared and printed elsewhere, mainly in the United States of America and England…I would say that very often when you use foreign sources, you have to be an experienced teacher in order to use them correctly, because many of the things which are presented are not really applicable. [I am] not suggesting that we tie our students down to knowledge about local issues only, but I believe that we need to have more material that speaks directly to our experiences. (Grace)

> …We have very little to no local empirical information that our students can access in terms of making alive, in a national sense, what they are doing. We tend to draw heavily on North America. So you find that somebody doing language experience approach in reading in terms of visual literacy will be using material that they find in books written in the US. Look at our rich and varied experiences? Can you imagine how much could have been written in terms of our students' language experience? I am yet to see somebody use the Jamaican [Creole] to meaningfully develop reading materials for our schools. We simply refuse to experiment with what we have. (Frank)

The challenges posed by the deficiencies surrounding print materials have pushed some teachers' college faculty to buttress the system with their own resources. According to one educator "The most that we can do is that sometimes [faculty] have to put our own books on the reserve shelf and have students photocopy appropriate chapters or use the book for a limited period" (Wayne).

31

In addition, the educators report that basic electronic resources and support such as audiovisuals and photocopying services are seriously wanting. Erica has just completed her second year of teaching; and she reflects on how her debut as teacher educator was affected by the absence of a basic piece of equipment:

> I evaluated myself and [felt] I could have done much more last year. I did not do enough because I had very little to use in terms of resources. For example I wanted a VCR to show my students something but there was none… So I am now thinking of buying one from personal funds because I really need it and that's the only way I am going to get it [or] you end up going back to the chalk-and-talk… (Erica)

In the excerpts below, participants express their frustration with the essential service of photocopying:

> We have a photocopying area with two machines operating, but the volume of work that the machines have to take see them breaking down often. Also you have to give stuff you want copied to the office in advance. Persons have to seek photocopying services outside of the college sometimes because it is not [always easy] to get the information and leave it to be copied within a specific time to get it for your class… (Carol)

> You want something photocopied for a class tomorrow [but] you are told, it can't be done because it has to be sent somewhere else away from the college and it's going to take so many days…and it just really frustrates you. (Jennifer)

According to another educator: "Sometimes I print at home; but then I can't print enough copies [for the entire class] and therefore I still have the problem with photocopying" (Latoya).

These resources are absolute essentials in the twenty first century if teacher education is to be efficient, effective and relevant. The woeful inadequacy of instructional resources that teachers' college faculty lament in this study may very well be a reflection of the economic state of the country. However, the researcher is of the view that this situation is partly indicative of the Jamaican governments' tepid commitment to teacher education.

In light of the experiences related by the participants, it would appear that little has changed since colonial times regarding government's attitude towards teacher education. During colonial times "teacher education was not a high priority item for the plantocracy" (D'Oyley & Murray, 1979). Teacher training institutions were established to train the offspring of the formerly enslaved blacks to become teachers to serve that population – not the white and brown class. As such, the colonial government cared very little about teacher training and hence left it to the churches. It was not until 13 years after emancipation that government took an active role in teacher education when they started a Normal School of Industry in 1847 to train male teachers in agriculture (D'Oyley & Murray, 1979), a rather strategically self-serving move. However, that attempt, plus two others failed until a permanent institution[9] was established by the government in 1885 at the behest of the missionaries, for a women's college (D'Oyley & Murray, 1979). It is not clear from the literature why the two institutions failed, but a likely reason is that they were not sufficiently supported by the colonial government. The researcher has not found much in the historical account either to comment definitively on the resources available to teacher training institutions then, but based on the poor conditions of elementary schools (King, 2003; Turner, 2001) which were under the same management of the churches, it is reasonable to assume that these institutions had little in terms of material support. And according to the findings of this study, today's teachers' colleges are still starved for resources even though they operate in a post-independent state.

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[9] Shortwood Teachers' College which is still in existence

The researcher hastens to acknowledge, however, that unfavorable economic realities facing Jamaica adversely affect the provision of resources for teacher education. After Jamaica lost strategic value to British imperialist expansion, the country was effectively abandoned and relegated to the status of a Third World state. Local administrators have never been able to stabilize the county to a point where it could effectively compete with the imperial powers who continue to control the bulk of world resources. Consequently, Jamaica remains in a constant struggle to meet its economic and social demands. Like any other society, Third World or industrialized, Jamaica has to provide roads, water, health, education and other crucial services for its citizens. The cost of providing and maintaining such services increases frequently in a capitalist driven environment, where industrialized countries tighten their hold on the world resources; and countries like Jamaica are forced to pay more in order to survive. It must be appreciated therefore, that the Jamaican government would experience difficulty to furnish educational institutions with resources.

Nevertheless, I am not convinced that the Jamaican government truly regards teacher education as an important priority that requires meaningful material support to function effectively. The researcher is not arguing here for government to necessarily provide cutting edge resources that can only be afforded by First World nations; rather, the researcher refers to basic materials and equipment that the participants in this study so eloquently argue are inadequate or nonexistent. There are creative ways that resources can be procured and shared if we are deeply committed to exploring such possibilities. If the Jamaican society is to unshackle itself from the predicament in which it finds itself as a nation, government needs to be much more committed to teacher education. The leaders must appreciate that if teachers' colleges are neglected, especially in the ways described in this study, then the capacity to prepare teachers who will make a significant difference in the life of the nation, greatly diminishes. Education has to be engaged differently, not as an avenue the privileged uses to achieve the "good life", but as a mechanism that is geared towards empowering the nation as a whole. This latter point segues into another that the researcher wishes to foreground – the dearth of local written material and the reliance on foreign text.

The twin problem of paucity in local written material and a heavy reliance on foreign sources, highlighted by the findings, challenge the degree to which the Jamaican government is serious about supporting national intellectual growth. It is quite troubling that, like in many other post-colonial societies (Lewin & Stuart, 2003; Mayumbelo, 1999; Coutinho, 1992), Jamaica has not relinquished its heavy dependence on foreign knowledge base after almost fifty years of political independence. It is understandable that since education was established by the colonial powers, the system would have relied on their knowledge initially, but it has troubled many observers that there has not been a significant shift from that dependence. For example, as early as 1922, Under Secretary of State, Major Wood, commented on the fact that Jamaica was too dependent on English publication and urged the preparation of local material in History, Geography, Hygiene, and Gardening (Whyte, 1983). Today, almost nine decades later, the Under Secretary's underlying concern still has strong resonance. While the educators in this study acknowledged that there is some noticeable change at the lower levels of the education system, teachers' colleges today have yet to benefit in any real sense from local scholarship. This problem must be rectified if teacher education is to have greater societal significance and relevance.

While it is prudent for all societies to learn from others, Third World societies in particular, must recognize that they remain victims of imperialism and neocolonialism because of their heavy reliance on Western knowledge. As Altbach (1995) asserts "Neocolonialism can be quite open and obvious, such as the distribution of foreign textbooks in the schools of a developing country" (p. 452). The Jamaican government must, therefore, guard against its unwitting partnership in neocolonialism. The government can alleviate this unflattering role by providing the resources to generate local knowledge and facilitate the empowerment of teachers' colleges with culturally sensitive material.

Improvement in the status of Jamaican teachers' colleges depends a great deal on the improvement of government's attitude in terms of providing them with the necessary resources. If

33

these institutions remain materially ill-equipped it retards their capacity to provide experiences that will prepare teachers who can make a positive difference in a failing education system. Consequently, if teachers' colleges are not positioned to make this difference they are unlikely to have the prominence and presence of effective tertiary institutions. This situation perpetuates the perception that the Jamaican teachers' college is not a legitimate institution of higher education; hence, it continues to occupy a space of positional inferiority in relation to the University of the West Indies.

Undervaluing and under-rewarding the services of teachers' college faculty

One important need for people who provide professional service is to feel that their efforts are justly rewarded. However, there is overwhelming evidence in this study to suggest that this need is largely unmet for teachers' college faculty in Jamaica. The participants in this study unanimously concur that they are grossly under-compensated for their services. In addition to faculty's wages being incommensurate with their out-put, there is a huge disparity between their remuneration and that of faculty at the UWI. The following comment eloquently illustrates the point:

> I don't think how [faculty] in teachers colleges are paid really equate the duties and responsibilities they have. For instance, when you compare say a college lecturer with a lecturer at the University of the West Indies…Our teaching load is much greater and very, very, taxing; and I don't think it's factored into the salary equation. Because, as a lecturer, your weekly teaching contact hours is about eighteen, and that doesn't include supervision, time to meet with students, preparation time, assessment time, involvement in extracurricular activities, and that sort of a thing. So I don't believe that what [faculty] are paid is anywhere reflective of the quality and volume of work we are asked to do. (Frank)

Because of the inadequate salary they receive, many participants in this study report that they have to seek additional income to supplement their earnings. In the following comments two faculty members attest to this reality:

> …Almost every lecturer at [this college] does something else. Some people teach part-time – they teach in high schools, [and] evening programs… to make a few extra dollars. And like me, I have been sewing for a long time and I earn a few dollars off that. But it's still scrimping and scraping for me. (Grace)

> Personally, I need an additional income, so I try to seek part-time work. I do my own personal teaching on a Saturday. This has nothing to do with the college, but I have to do that 'cause my current salary does not give me enough to tide me over to the next payday. (Latoya)

The findings of this study indicate therefore, that the services of Jamaican teachers' college faculty are not only under-rewarded but under-valued. This results in a scenario that forces the educators to seek supplemental sources of livelihood. What accounts for this economic injustice, and what are the implications for teacher education and Jamaican education in general, are important questions to examine.

The apparent disregard for the work of Jamaican teachers' college faculty may be rooted in the historical fact that the teachers' college came into being as an institution for the black majority who were second class citizens in colonial Jamaica. Although the majority of teachers' colleges were established since the 1800s[10], long before the UWI was established in 1948, they still have not been upgraded to full degree-granting status – a precondition for improved salary, as argued by government. However, the UWI was conceived as a degree granting institution from its inception. An essential difference between the UWI and the teachers' college is that the former was historically designed for

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[10] Mico (1836), Bethlehem (1861), Shortwood (1885), and St. Josephs (1897)

the middle class and the 'academic elite', while the latter was designed to serve the working-class and the educationally dispossessed. Consequently, the teachers' college was even considered the black man's secondary school (Miller, 1990) during the colonial period; and even today, not truly recognized as a tertiary institution. It is also important to note that teachers' college graduates were not considered suitable for teaching in traditional high schools[11] until in the 1950s, and even then, they taught only the lower grades[12] in those schools. On the other hand, UWI graduates [although not trained as teachers] were recruited to teach in the traditional high schools once the institutions started producing graduates (Miller, 1990). Hence, the stage was set for teachers' college faculty's service to be seen in a lower regard than that of UWI faculty.

The low regard for the educators' work, therefore, is part of an insidious process that continues to lock teachers' colleges into positional inferiority in relation to UWI. Based on the origin and treatment of teachers' colleges, the path was set for them to remain lower-tiered institutions unless radical interventions are made to alter that course. The status quo has largely remained, and paying teachers' college faculty pittance wages for their work is one way of sealing the fate of these institutions. Because teachers' colleges are not full degree-granting institutions, they are not considered legitimate tertiary institutions; hence, teachers' college faculty members are also not considered legitimate higher education faculty and are paid accordingly.

The Jamaican government has demonstrated little foresight regarding the implications of undervaluing the work of teachers' college faculty. To some degree, I understand the reluctance towards upgrading the status of teachers' colleges because of the short-term economic implications it would have for funding higher wages. However, government must also be cognizant of the long-term opportunity costs for not improving education in this fundamental way. There is little doubt that under-paying the individuals who prepare teachers will ultimately compromise the quality of the teaching services in general. The almost desperate struggle for economic survival among most teachers' college faculty will adversely affect their morale, commitment and professional dignity.

As found in this study, most lecturers have to engage in additional income generating activities to offset their expenses in a country with a high cost of living. This undoubtedly compromises commitment to their primary assignment in the colleges. Consequently, teachers' colleges have experienced the exodus of many educators to the USA, Canada and Britain where they feel that their services will be better rewarded and where they can enjoy a higher standard of living. These are usually competent, highly qualified and well-experienced individuals who have left a void in the education services. This vacuum may take a few months to fill quantitatively, but years qualitatively. Although these individuals may send well needed remittances back to Jamaica, their real contribution benefits the already enriched industrialized countries in which they now practice. Thus, industrialized powers continue to fortify their empires on the resources of Third World countries like Jamaica, albeit in more subtle and generally acceptable ways.

Conclusion

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[11] Prior to that time high school teachers were largely expatriates and white and brown Jamaicans trained in Britain.

[1212] Jamaican high schools normally comprised of grades from 7 – 12; or 7 – 13 in some schools that still adheres strictly to the colonial system. Grades 7 – 9 are considered lower school and 10 upwards are classified as upper school. It is established in the Jamaican school system that it is the 'smarter' teachers who are assigned to teach the upper grades.

The issues discussed in this paper are representative of the findings of a larger study that in whole and in part, strongly indicate that there are entrenched colonial vestiges that continue to undermine the Jamaican education system and teacher education in particular. The disregard for the educators' grounded knowledge, lack of material support for the colleges, and inadequate remuneration, are three poignant indicators of gross neglect. These issues present compelling evidence that Jamaica continues to operate an inequitable system of education. As reflected in the treatment of teachers' college faculty in relation to their counterparts at the University of the West Indies, teachers' colleges are not considered legitimate institutions of higher learning. Based on postcolonial discourse, the researcher concludes that this disregard for the educators, vis-à-vis teachers' colleges, is reminiscent of the colonial powers' negative attitude towards the social mobility of the black population during slavery and colonialism. Jamaica's inability to break free from these chains of inequity and elitism in education suggests that the society still has a significant distance to cover in extricating itself from an oppressive past.

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TEACH ONLY WHEN UNDERSTANDING: THE STRATEGIES OF TEACHING INDUSTRIAL DESIGN TO THE NET GENERATION

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Abstract: Industrial Design education has been defined by craft and well known for its 'immersed' and 'practice-based' learning environment. Most of Industrial Design schools continue to reference and embrace Bauhaus style studio courses centered on individual, hands-on product development. The design assignments have traditionally focused on researching, sketching, model making, and presentation. However, many industrial design teachers are now struggling with teaching current college design students, the so-called 'Net Generation', due to their preference and reliance on digital technology for learning. Since design education can never be accomplished solely by using digital technology, design educators are now facing major transformational change as digital technology alters how learning is enabled. This paper will explore and demonstrate how Industrial Design can be taught to the Net Generation with the understanding of their learning mode and characteristics making learning more relevant and effective. Specific examples of approaches integrated into a third year Industrial Design studio course will be illustrated.

Keywords: Teaching Strategy, Net Generation, Industrial Design Education

Introduction

Many current university students belong to the 'Net Generation (or Net Geners) '- a label used to describe today's young adults along with other terms including 'Digital Natives' (Prensky, 2001) and 'Generation Y' (McCrindle, 2006). This group of individuals, born between 1980 and 1994 (McCrindle, 2006), have been characterized by their familiarity with and reliance on information and communication technologies. They have " spent their entire lives surrounded by and using computers, digital music players, video games, cell phones, and all the other toys and tools of the digital age" (Prensky, 2001). A number of social psychologists have argued that the digital culture in which the Net Generation has grown up has influenced their preferences and skills in a number of key areas related to education. For example, the Net Geners are said to prefer receiving information quickly; expect immediate answers; have a low tolerance for lectures; prefer multi-tasking and non-linear access to information; prefer active rather than passive learning; rely heavily on communication technologies to access information and to carry out social and professional interactions (Frand, 2000; Prensky, 2001).

Industrial Design education has been defined by craft and well known for its 'immersed' and 'practice-based' learning environment (Kolko, 2000). Most of Industrial Design schools continue to reference and embrace Bauhaus style studio courses centered on individual, hands-on product development. The design assignments have traditionally focused on researching, sketching, model making, peer evaluation and presentation. The problems faced by current Industrial Design educators are students' little patience with the intensive and long design development process and their reliance on information and communication technologies as the major information resource.

The goal of this paper is not to change the nature of the Net Geners or the current design pedagogies, but to propose some teaching strategies that both accommodate the needs of the 'Digital Natives' and ensure that the learning of Industrial Design in design schools is relevant and effective.

The Traditional Industrial Design Education

According to IDSA (Industrial Designers Society of America), 'Industrial Design' is the professional service of creating and developing concepts and specifications that optimize the function, value and appearance of products and systems for the mutual benefit of both user and manufacturer (http://www.idsa.org/). Therefore, most Industrial Design curricula include courses related to problem solving, form development, human factors, designing for manufacturability, computer visualization,

38

and rapid prototyping. Design studio is often regarded as the most essential course for Industrial Design students due to its possibility for students to examine what they have learned from other core courses. It is often structured with activities including observational user research, personal interviews, concept ideation, sketch development, rendering, experiential prototyping with a working model, and usability studies.

These assignments allow students to hone their abilities in understanding their target users, generating relevant solution with great form development, and furthermore achieving user-centered design. The focus on individual skill building, however, is often at the expense of a semester long project. Students complain that these activities are 'time-consuming' and 'short of efficiency' and suggest that the instructors should tailor their teaching to match the skills, experiences and expectations of their 'Net Generation' students.

Characteristics of Net Generation

The term 'Net Generation' was coined by Tapscott in 1997. It is linked directly to the (Inter)net and the emerging digital technology of the 1990s with which this generation grew up. To date, more than 30 books have been written on the Net Generation, which report the results of several surveys and research describing their characteristics. Berk, the former Assistant Dean for Teaching at The Johns Hopkins University, synthesizes the survey research evidences from multiple sources and extends the work by the preceding authors in an effort to help faculty members in higher education understand the characteristics of the Net Generation and enhance the effectiveness of their teaching (Berk, 2009). Among the various sets of characteristics presented in the literature, 20 common denominator characteristics emerge that have a direct bearing on learning. The educational implications of the characteristics are shown below:

1. *Technology savvy*: Having grown up with the technology, the Net Geners are familiar with most forms of digital gadgetry. They have spent their entire lives surrounded by all of the toys and tools of the digital age. The technology affects everything they do and buy. They expect information to be at their fingertips. Their experience with the technology has enabled them to master complex tasks and make decisions rapidly.

2. *Relies on search engines for information*: About 89% of Net Generation begins searches for everything with search engines like Google. They have an "ease-of-use" mentality. Their high comfort level with the technology has fostered a false sense of ability, such that they routinely overestimate their skills at finding and evaluating online information.

3. *Interested in multimedia*: They are accustomed to entertainment, speed, and accessing music, videos, games, and information their own way. They prefer interactive media rather than passive TV. They have experience with massively multiuser games and participate in virtual worlds, which are immersive, animated, and 3D environments. Many will obtain their music, videos, ringtones, and software online. Leveraging these media in the classroom is critical to connecting with their culture.

4. *Creates Internet content*: They are not only avid users of the technology, with 90% using the Internet to assist with homework; they also contribute to its content. About 57% of them design and write Websites, post blogs with pictures and original artwork, and make videos for YouTube daily.

5. *Operates at "twitch speed"*: This generation grew up with the quick pay-off world of video games, MTV, the Internet, and ultra-fast speed of action films. They are used to the instantaneity of hypertext, downloaded music, iPhones in their pockets, a library of resources

on their laptops and IMing. They prefer random access, graphics-first, active, connected, fun, and fantasy activities. They have adapted to speed and even thrive on it. That translates into their" needs for speed" in everything they do by themselves and in their relationships.

6. *Learns by inductive discovery*: They prefer to learn by doing rather than being told what to do or reading text or manuals. They are kinesthetic, experiential, hands-on learners. They must be engaged, constantly connected with first-person learning, games, simulations, and role-playing.

7. *Learns by trial and error*: With their Nintendo mentality, they will jump right in and do what is necessary to solve a problem using trial and error, failing, starting over, and so on. They will seek help only if they can't come up with the answer.

8. *Multitasks on everything*: They can naturally do several tasks easily at the same time. The Net Generation can move quickly from one activity or medium to another, such as chatting with their friends on a cell phone while surfing the Net and watching TV. Mixing play and work is common. It's part of their lifestyle.

9. *Short attention span*: Again the Net Generation is used to speed in everything they do and touch. They must be actively engaged, doing some task, and having fun doing it, or boredom and impatience take over. They are used to immediate results and pay-offs for performance. That satisfies their needs for feedback and instant gratification.

10. *Communicates visually*: They are visually literate, comfortable in an image-rich rather than text-only environment. Many don't like to read books, especially textbooks. They perceive print as expensive, boring, and a waste of time. Instead, they prefer visuals, graphics, and images of any kind.

11. *Craves social face-to-face interaction*: Relationships are a high priority in the Net Generation's lives. Despite the hours that they spend in IMing and social media communications, they also gravitate toward activities that promote and reinforce in-person conversation, interaction, and collaboration.

12. *Emotionally open*: They express their feelings easily. They are open to meeting new people, sharing personal information, and digital storytelling online in blogs or other social media. They also want the opportunity to express their opinions and ideas in class or small group discussions and Q & A sessions.

13. *Embraces diversity and multiculturalism*: The Internet fosters diversity. The Net Generation's exposure and connection to the whole world through global communications have given 72% a tolerance, appreciation, and sensitivity for multiculturalism and 79% the ability to work with diverse people.

14. *Prefers teamwork and collaboration*: As stated above, the Net Generation has strong social tendencies and a need for interpersonal interaction, both online and face-to-face. They prefer to work in teams rather than alone. Collaboration enables their "collective intelligence" to emerge through the pooling of knowledge, research, arguments, and insights from diverse groups of people.

40

15. *Strives for lifestyle fit*: Net Gen students want flexibility in their lives. Many are non-traditional students who attend college part-time, work full- or part-time. Lifestyle fit is extremely important. They want their school to fit their lifestyle.

16. *Feels pressure to succeed*: They feel pressure from their Boomer parents to succeed at whatever goals they set. They are goal-oriented—setting college, career, and life goals. Being able to accomplish these goals and efficiently do what needs to be done is more important than accumulating a bunch of facts. They focus on short-term achievement and grades at the expense of critical thinking skills and deep learning.

17. *Constantly seeks feedback*: This characteristic is part of the 'Trophy Kid' mentality. The Net Geners want to be recognized for their efforts and achievements. Receiving regular and speedy feedback on their performance is important at school. They prefer objective methods of assessment and explicit guidelines on " How to Make As", which are inconsistent with most performance assessments.

18. *Thrives on instant gratification*: The speed with which the Net Generation operates in every aspect of their lives has provided them with instant gratification. Their lack of patience can create frustration and boredom.

19. *Responds quickly and expect rapid responses in return*: It's all about speed, efficiency, and "don't waste my time." Since the Net Generation operates at "twitch speed" and multitask as a way of life, they expect everyone else to respond quickly to all communications. They have zero tolerance for delays.

20. *Prefers typing to handwriting*: Taking notes in class the old fashioned way is not the Net Generation's way. They want to type notes, communications, and papers on their PC/Mac or iPhone. That is what they are used to doing. The advantages of Word far outweigh any alternative of verbal print communication.

Although not every Net Gen student shares the same personality and could be diverse in learning style and attitude, the major characteristics of the Net Generation are still being highly valued as the most effective guide for practices in higher education (Junco and Mastrodicasa, 2007).

Strategies for Teaching Industrial Design To The Net Generation

Take into consideration the nature of Industrial Design education and the characteristics of the Net Generation, eight strategies for teaching Industrial Design are formulated and examined in a third year design studio—usually the first design studio for Industrial Design college students to tackle real product design issues. These strategies are:

Strategy One: Incorporate digital technology into lectures, in-class and out-of class assignments, activities, demonstrations, and communications between teacher–student and peers. (*Tech Savvy*)

Strategy Two: Provide assignments that draw on the students' search engine skills, but give guidance and instruction on how to think critically about the information and on how to maximize the value of the search results. (*Relies on Search Engines*)

Strategy Three: Most Net Gen students are visually literate, the use of multimedia, such as graphics, images, videos, or music that are student favorites in the lectures, assignments, and even their reports will draw their attention and enhance their engagement. (*Visually Literate; Interested in Multimedia*)

Strategy Four: Provide a performance-oriented design studio; focus on the quality of their design and emphasize the ability of time management and responsibility at the same time. Students will engage and participate better in their learning when they are operating at their own pace. (*Pressure to Succeed; Lifestyle Fit; Operates at Twitch Speed*)

Strategy Five: Divide the class period into multiple sessions- such as the combination of short lectures, in-class exercise, group-discussion, class brainstorming and peer-evaluation. The Net Generation has short attention span and prefers multitask, the variety of class activities will keep students engaged in different way and ensure that learning is happening. (*Short Attention Span; Multitask; Prefers Teamwork; Embraces Diversity*)

Strategy Six: Provide hands-on, exploratory, and trial –and-error problem solving exercises, individually or in groups, to allow students test their own strategies and discover the solutions. The Net Generation likes to take control of their learning as an active learner. (*Experiential/ Kinesthetic; Trial and Error; Emotionally Open*)

Strategy Seven: Tap students' multiple intelligences and learning styles to give every student the chance to succeed; encourage students think critically and independently while providing fair and appropriate assessments of achievement. (*Pressure to Succeed; Lifestyle Fit*)

Strategy Eight: Provide regular and prompt constructive feedback- positive and negative, print, online, and face-to-face. The Net Generation seeks for instant feedback and gratification, and enjoys interacting with classmates or professors. (*Face-to-Face Interaction; Seek Feedback; Instant Gratification; Responds Quickly*)

Again, the goal of creating these strategies is to ensure that the learning of Industrial Design is relevant and effective with a special consideration of the needs of the Net Gen students. The first test of these strategies has been conducted within a third year design studio, and a post-questionnaire at the end of the semester gets the feedback from the enrolled students and validates the effectiveness of these strategies.

How These Strategies Work

By applying Strategy Five, the Basic Product Design Studio is structured in the form of multiple sessions with respective topics. Each session takes about 2-3 weeks and is comprised of four distinct phases, each of which requires its own set of design parameters and skill application. These phases are defined as: Observation, Analysis (Research Presentation), Application (Design Project), and Testing (User and Peer Evaluation) (Fig. 1).

Fig. 1. The process of learning Industrial Design.
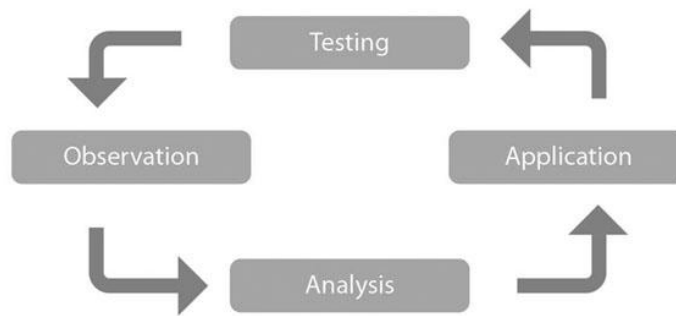
Prior to beginning any sessions, one lecture is introduced to the students and a class-discussion is followed to allow students the chance to interact with their peers and the faculty. The lecture is usually taken place in the form of PowerPoint presentation with multiple media such as graphics, images, and videos. During the Observation Phase students are required to research a specific topic assigned by the professor. They are encouraged to use different types of technology to observe design and present their findings in different types of techniques, such as drawing, photo-taking, videotaping, and so on. Students enjoy the way they take control of their learning style and pace in an open yet well-defined direction. (Strategy Two, Three, Four, and Seven)

The Analysis Phase requires students to bring the results developed from the previous phase to the class in any kinds of format and share their findings with other students. The live methods such as Q&A, in-class discussion, and brainstorming create a team atmosphere for learning where the professor is part of the team. The active and collaborative activities enable students to pool knowledge, debate, share opinions and create new insights. The immediate feedback is given from the professor during these activities to enhance the interactions between students and professor. (Strategy One, Two, Four, Seven, and Eight)

Following the Analysis Phase, the Application Phase challenges students to develop idea sketches, renderings, and physical models of their design in order to communicate their concepts. Prior to beginning this phase, a well-structured project handout and the design schedule are presented to the students as an agreement. The handout defines the game rules, such as the goal of this project, the basic requirements, the deliverables, and the grading criteria. Students are exposed to a hands-on learning environment and gain the ability to connect the function and the form in the product designed by them through physical mock up making. One-on-one meetings are taken place during the design development process for the students to get the instant feedback and guidance from the professor. (Strategy Four, Six, Seven and Eight)

During the Testing Phase students are required to test their design works, observe how users interact with these products, and document the process of operation to better understand how the form of an artifact influences the quality of design and user experience. Students are encouraged to photograph or videotape the process of testing and incorporate these media into their final presentations. In-class critique is taken place to provide prompt and interactive feedback to the presenters. (Strategy One, Three, Six, Seven, and Eight)

At the end of this semester, a questionnaire was conducted to students from three different third year design studios. The Design Studio C is the one adopting these new teaching strategies. Five simple questions with evaluation scales ranking from 1 (Strongly Disagree) to 5 (Strongly Agree) were provided to all of these fifty-two students. The following table shows the questions and the results of this questionnaire:

Table. 1. Questionnaire results. [1=strongly disagree; 5=strongly agree]

43

Design Studio adopting New Teaching
Strategies to the Net Gen students

	Students in Studio A (n=17)	Students in Studio B (n=18)	Students in Studio C (n=17)
This design studio positively affected my understanding of the industrial design process	4.2	4.10	4.55
This design studio positively affected my contextual user research abilities	3.76	3.59	3.93
This design studio positively affected my ability in form development	4.0	3.8	4.2
This design studio positively affected my ability to work in teams	3.9	3.2	4.6
This design studio positively affected my ability in both visual and verbal presentation	4.4	4.0	4.8

This post-questionnaire confirmed the perceived validity of these teaching strategies. The responses from students in Design Studio C yielded five mean responses either about or above 4 (4 being agree). It shows that students in Design Studio C, the one adopting these teaching strategies, have better learning experience and effectiveness and are well-equipped with fundamental design abilities.

Conclusion

Design education needs to prepare and equip future designers with the necessary and appropriate skills to support them professionally. This design studio does not just expose entry-level design students to the knowledge of Industrial Design, but also tries to create a "learner-centered" learning environment to ensure that learning is relevant and effective. Through this design studio, students sharpen their design skills and learn to take control of their own learning. The later ability to a design educator is more meaningful than the former one since "keep learning" is one of the best strategies to the success in the field of Industrial Design and the ever-changing digital era.

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