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EJES, Team

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VISUAL WORKING MEMORY - GENDER AND AGE DIFFERENCES.

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Abstract

The visual working memory forms the basis for cognitive processes in learning, and it is therefore of interest to gain greater insight into gender and age differences in visual working memory among pupils. In this study, we wanted to see if there are differences between children in first, third, fifth, seventh and ninth grade in Norwegian schools when it comes to issues of visual working memory. The sample consisted of 458 students, 233 females and 225 males. We wanted to see if there is gender differences in visual working memory, and if there are differences in working memory effects for students in different grades. We also wanted to see how repetition and practice have an effect on visual working memory.

There were no significant between-gender differences. Students in fifth grade scored better on visual working memory than students in seventh grade when they were presented with 20 percent fewer symbols. This indicates that reducing the number of factors to be remembered increases learning effect. The results from this study support earlier studies that have demonstrated that visual working memory increases with age. There was a clear learning effect related to number of repetitions for students of all ages.

Introduction

According to Baddeley (1974), all learning is dependent on working memory. While long-term memory (LTM) has virtually unlimited capacity, information that is to be remembered and transferred to long-term memory, must first be stored in working memory, and therefore working memory plays a central role in learning. Importantly, while many studies have been

conducted regarding auditory working memory, fewer have related to visual working memory, and since developmental changes are not only related to children's auditory working memory, but also, to a great extent, their visual working memory, Vales and Smith (2014) claim that this is an unfortunate state of affairs for studies exploring learning. Therefore, in this study we address the subject of visual working memory.

Visual working memory has limited storage and processing capacity, and information is therefore normally forgotten after a given amount of time, unless the information is repeated. In such situations, remembering information refers to an attempt at recalling pictures one has encountered in earlier situations. According to Tetzchner (2012), attempts to recall information in this manner may be compared to a process of "recreation", whereby one's interpretations (and prior knowledge) influence that which is recalled. Students depend on working memory when they are trying to remember information for short periods of time, or when they work with cognitively demanding tasks. In such cases, visual working memory is responsible for successful outcome, that is, how well information is remembered. This outcome can be measured by the passage of time from the visual input and the student's ability to recall verbal information.

Working memory is critical for successful cognition (Cowan 2010). Working memory represents an expansion and modification of the information that is stored in long-term memory, while reduced working memory capacity can lead to increased incidences of distraction, problems in instigating and sustaining tasks over time, difficulties with organizing work, as well as trouble with receiving and remembering instructions. Students with reduced auditory or visual memory may be at an increased risk of developing learning difficulties.

In light of this strong relation between working memory and students' learning, in particular regarding mathematics and reading instruction, there is a great need for more knowledge about working memory processes and functioning.

There is a close relation between visual working memory and visual attention (Hollingworth and Maxcey-Richard, 2013:1047). Further, Baddeley and Hitch (1974) have demonstrated that working memory can be divided into three main elements; namely, central executive, phonological loop and visuo-spatial sketchpad. Information can be held in the phonological loop for approximately two to three seconds, possibly longer if the information is repeated. The visuo-spatial sketchpad's function is to store information of visual and spatial character over shorted periods of time. Finally, control processes such as repetition, coding, and choice of recall strategies in short-term memory, all influence how information is sent to long-term memory, influencing children's learning capacity, or storage of information.

Cowan (1988) presents a revised model of information processing that is depicted in a slightly simplified form. In his model the phonological and visuospatial stores are just considered instances of the temporary activation of long-term memory information.

Presentation of research questions

Reduced visual working memory is often related to mathematics and reading difficulties. Helland and Asbjornsen (2004) have shown that a subgroup of students with dyslexia also experience difficulties with visuo-sequential and visuo-spatial skills, and more recent research suggests that children with dyslexia may also have difficulties with visual attention (Bucholz and Almola Davies 2006). It is important to gain more knowledge about memory capacity in different age groups.

In a study of visual working memory among students attending scientific and humanistic studies at two university-colleges (Amundsen, Garmannslund & Stokke 2014) we found that students studying scientific subjects scored significantly higher than students that were studying the humanities. Since there are grounds to believe that the majority of students that choose scientific subjects are relatively competent in mathematics, this study may support similar studies that have concluded that there is a relation between visual working memory and mathematical skills (Adler 2007).

Further, since eight of ten students that studied scientific subjects in the investigation were male, and approximately the same proportion of the humanities students were female, the question of gender differences arose. However, in the aforementioned study, non-random sampling excluded the possibility of further investigating gender differences.

In order to address the question of gender differences in working memory, we decided to address a different age group of students, namely, first to ninth graders in Norwegian elementary schools. In this study we used «Test of Visual Learning.» Our main aim was to investigate possible age and gender-related differences in visual working memory in Norwegian students in different grades, and we addressed the following three research questions:

- Is it possible to demonstrate gender differences in visual working memory?
- Is it possible to demonstrate that repetition and practice have an effect on visual working memory?
- Are there differences in working memory effects for students in different grades?

Method

Participants in the present study were from three different schools in Norway. Furthermore, participation was voluntary and anonymous. The

study was also based on the principle of informed consent, meaning that the students were able to decide whether they wanted to participate in the study, and they had the right to withdraw from the study at any time, without any negative consequences for the individual students.

The «Visual Test for Learning» is a computer-based test that measures visual working memory. Students in first, third and fifth grades were presented with a computer screen with 16 black squares, whereas students in seventh and ninth grades were presented with 20 black squares on their screens (i.e., the test for the elder students was slightly more difficult).

The sample consisted of 458 students from first to ninth grade at elementary/lower secondary level (233 females, 225 males). The reported population is the total after the exclusion of 21 participants that did not complete the test. Table 1 (below) shows the distribution of students across the different grades.

Table 1. Distribution of participants in different grades

1st grade	3rd grade	5th grade	7th grade	9th grade
75 students	63 students	110 students	76 students	134 students

Procedure

In this study, a performance score was calculated on the basis of two dependent variables: time used to solve the task and the amount of "moves" used. A new latent variable, "Visual memory" (VM), was computed. VM was measured at five measuring points VM1 to VM5. Scale reliability was assessed by Cronbach´s alpha and indicates good internal consistency.

Table 2 Mean dependent variable, standard deviation and Cronbach´s alpha

Variable	Mean	SD	Cronbach´s alpha
VM1	94,05	27,23	0,67
VM2	75,33	25,66	0,74
VM3	69,49	26,24	0,88
VM4	65,22	26,49	0,91
VM5	70,73	27,28	0,88

All students were instructed to connect two symbols, specifically, socks, with another two socks that were the same color, and then to connect two more abstract symbols to their counterparts. All of the symbols could be located by turning the cards on the screen. In the case where a student successfully identified two identical symbols, they remained face up on the screen. This process was repeated five times. The concrete objects (the socks) and the abstract symbols were located under the same squares (or

"cards") during each trial, and the students could see the symbols for eight seconds at a time.

The students were first presented with five sets of concrete symbols, and subsequently, with five sets of abstract symbols. After five minutes, they were again presented with two sets with the same concrete symbols and the same abstract symbols. The computer program registered how much time each student used on the different tasks, as well as how many times they had to turn the cards in order to complete the task. Since there was an element of randomness regarding which cards the students would turn over, we chose to present the first round as a trial round. VM1 to VM4 in the tables shows learning- effect for the first four rounds, while VM5 shows the learning-effect after five minutes.

Students in seventh and ninth grade were presented with 20 concrete and abstract symbols, while the students in first, third, and fifth grade were presented with 16 (20% fewer squares).

Results
Gender differences

We investigated possible gender differences using an independent-sample *t*-test. The result of the test showed no significant gender differences regarding visual working memory.

Age differences
First grade
Table 3 Means and standard deviations at different measuring points (VM1-VM5)

	Mean	Std. Deviation	N
VM1	1,713	0,141	61
VM2	1,623	0,154	61
VM3	1,570	0,156	61
VM4	1,551	0,160	61
VM5	1,542	0,139	61

A repeated measures ANOVA was conducted to determine whether there were statistically significant differences in "Visual Memory". Due to outliers data was moderately positively skewed, as assessed by boxplot and Shapiro-Wilk test (p>.05), and a "logarithmic" transformation was successfully applied. Mauchly´s Test of Sphericity indicated that the assumption of sphericity had not been violated, $\chi2(2)= .965$, p=.380. There was a significant change in "Visual Memory" (VM) over time, $F(4, 240)=29.478$, $p< .01$, partial $\eta^2 = .329$, with VM decreasing from 1.713 +/-

.141   at VM1 and to 1,542   +/- .138 at VM5. According to guidelines proposed by Cohen (1988) (.01=small, .06=moderate, .14 large effect) these results suggest a large effect size.

Post hoc analysis with Bonferroni adjustment revealed that VM improved to a statistically significant degree from VM1 to VM2 (*M*= -.090, 95% CI[-.146 to -.035], *p* < .01) VM1 to VM3(*M*= -.144, 95% CI[-.202 to -.085], *p* < .01), VM1 to VM4 (*M*=-.162, 95% CI[-.222 to -.102], *p* < .01), VM2 to VM4 (*M*= -.072, 95% CI[-.123 to -.021], *p* < .01), VM1 to VM5 (*M*= -.171, 95% CI[-.225 to -.118], *p* < .01), VM2 to VM5 (*M*= -.081, 95% CI[-.129 to -.033], *p* < .01), but not from VM2-VM3 (*M*= -.053, 95% CI[-.108 to .001], *p* < .06), VM3 to VM4 (*M*= -.019, 95% CI[-.067 to .030], *p* =1 .000), VM3 to VM5 (*M*= -.028, 95% CI[-.085 to .030], *p* =1 .000) and VM4 to VM5

As shown in Table 3 (above), the learning effect corresponds with the number of repetitions. It is worth noting that this learning effect is also present from VM4 to VM5.

Third grade

Table 4 Means and standard deviations at different measuring points (VM1-VM5)

	Mean	Std. Deviation	*N*
VM1	1,629	0,133	63
VM2	1,540	0,137	63
VM3	1,497	0,156	63
VM4	1,483	0,164	63
VM5	1,479	0,121	63

A repeated measures ANOVA was conducted to determine whether there were statistically significant differences in "Visual Memory". Due to outliers, data was moderately positively skewed, as assessed by boxplot and Shapiro-Wilk test (p>.05), and a "logarithmic" transformation was applied with success. Mauchly´s Test of Sphericity indicated that the assumption of sphericity had not been violated, $\chi2(2)$= 13.794, p=.130. There was a significant change in "Visual Memory" (VM) over time, $F(4, 248)$=29.019, *p*< .01, partial η^2 = .319, with VM decreasing from   1.629 +/- .133 at VM1 and to 1,479 +/-   .121 at VM5. The results indicate a large effect size accounting for 31.9 % of the variance in scores (Cohen, 1988; Richardson, 2011).

Post hoc analysis with Bonferroni adjustment revealed that VM changed to a statistically significant degree from VM1 to VM2 (*M*= -.089, 95% CI[-.137 to -.035], *p* < .01) VM1 to VM3(*M*= -.132, 95% CI[-.182 to -

.083], *p* < .01), VM1 to VM4 (*M*=-.146, 95% CI[-.195 to -.097], *p* < .01), VM2 to VM4 (*M*= -.057, 95% CI[-.106 to -.009], *p* < .01), VM1 to VM5 (*M*= -.150, 95% CI[-.199 to -.101], *p* < .01), VM2 to VM5 (*M*= -.061, 95% CI[-.116 to -.007], *p* < .01), but not from VM2-VM3 (*M*= -.043, 95% CI[-.090 to .003], *p* = .086), VM3 to VM4 (*M*= -.014, 95% CI[-.050 to .022], *p* =1 .000), VM3 to VM5 (*M*= -.018, 95% CI[-.068 to .032], *p* =1 .000) and VM4 to VM5 (*M*= -.004, 95% CI[-.050 to .042], *p* =1 .000).

As shown in the table above, third graders also demonstrated a clear learning effect that corresponds with number of repetitions. Also for the third graders, the learning effect is still present as measured from VM4 to VM5, and as can also be seen in the table, these students also clearly profit from repetition (set VM1 to VM4).

Fifth grade

Table 5 Means and standard deviations at different measuring points (VM1-VM5)

	Mean	Std. Deviation	*N*
VM1	0,031	0,010	110
VM2	0,038	0,011	110
VM3	0,042	0,013	110
VM4	0,047	0,013	110
VM5	0,043	0,012	110

A repeated measures ANOVA was conducted to determine whether there were statistically significant differences in "Visual Memory". Due to unequal variances of data at different time points, as assessed by boxplot and Shapiro-Wilk test (p>.05), an "inverse" (or "reciprocal") transformation, was applied with success. Mauchly´s Test of Sphericity indicated that the assumption of sphericity had been violated, $\chi2(2)$=30,901, *p*< .01. Therefore a Huynd-Feldt correction was applied (ε= ,929). There was a significant change in "Visual Memory" (VM) over time, $F(3,715, 404,894)$=65,745, *p* < .01, partial η^2 = ,376, with VM improving from   ,031 +/- ,010 at VM1 and to ,043 +/-   ,012 at VM5. The results indicate a large effect size accounting for 37.6 % of the variance in scores (Cohen, 1988; Richardson, 2011).

Post hoc analysis with Bonferroni adjustment revealed that VM changed to a statistically significant degree from VM1 to VM2 (*M*= .007, 95% CI[.004 to .010], *p* < .01) VM1 to VM3(*M*= .011, 95% CI[-.008 to .014], *p* < .01), VM2 to VM3 (*M*=0.004, 95% CI[.002 to .007], *p* < .01), VM1 to VM4 (*M*= .016, 95% CI[.013 to .019], *p* < .01), VM2 to VM4 (*M*= .009, 95% CI[.006 to .012], *p* < .01), VM3 to VM4 (*M*= .005, 95% CI[.002 to .007], *p* < .01), VM1 to VM5 (*M*= .012, 95% CI[.009 to .015], *p* < .01),

VM2 to VM5 (M= .005, 95% CI[.002 to .008], $p < .01$), VM4 to VM5 (M= -.004, 95% CI[-.007 to .00], $p < .01$), but not from VM3 to VM5 (M= -.001, 95% CI[-.002 to .004], $p = 1.000$).

Please note that because of the inverted transformation, an increase in the M in table 4 actually reflects a decrease in time and moves used.

For the fifth grade students, we were able to observe a clear learning effect from the first to the fourth repetition. The learning effect for these students appears to be greater than for the younger students (partial η^2 = ,376). It is, however, worth noting that the learning effect decreases to a certain degree from VM4 to VM5 for these students, which was not the case for the 1st and 3rd graders.

Seventh grade
Table 3 Means and standard deviations at different measuring points (VM1-VM5)

	Mean	Std. Deviation	N
VM1	0,023	0,006	75
VM2	0,029	0,008	75
VM3	0,032	0,010	75
VM4	0,035	0,011	75
VM5	0,032	0,009	75

A repeated measures ANOVA was conducted to determine whether there was a statistically significant difference in "Visual Memory". Due to unequal variances of data at different time points, as assessed by boxplot and Shapiro-Wilk test (p>.05), an "inverse" (or "reciprocal") transformation was applied with success. Mauchly´s Test of Sphericity indicated that the assumption of sphericity had been violated, $\chi2(2)$= 20,092, p=,017. Therefore a Huynd-Feldt correction was applied (ε= ,936). There was a significant change in "Visual Memory" (VM) over time, $F(3,743, 277,008)$=44,564, $p < .01$, partial η^2 = ,376, with VM improving from   ,023 +/- ,006 at VM1 and to ,032 +/-   ,009 at VM5. The results indicate a large effect size accounting for 37.6 % of the variance in scores (Cohen, 1988; Richardson, 2011).

Post hoc analysis with Bonferroni adjustment revealed that VM changed to a statistically significant degree from VM1 to VM2 (M= .006, 95% CI[.004 to .008], $p < .01$) VM1 to VM3(M= .009, 95% CI[.007 to .012], $p < .01$), VM2 to VM3 (M=0.003, 95% CI[.000 to .006], $p < .01$), VM1 to VM4 (M= .012, 95% CI[.009 to .015], $p < .01$), VM2 to VM4 (M= .006, 95% CI[.003 to .008], $p < .01$), VM1 to VM5 (M= .009, 95% CI[.006 to .011], $p < .01$), VM4 to VM5 (M= -.003, 95% CI[.006 to .000], $p < .01$),

but not from VM3 to VM4 (*M*= .002, 95% CI[.000 to .005], *p* 0 .108), VM2 to VM5 (*M*=-.002, 95% CI[-.001 to .005], *p* = .274) and VM3 to VM5 (*M*= -.003, 95% CI[-.006 to -.000], *p* =1 .000).

  Thus, also for the seventh graders, we were able to observe a clear learning effect from the first to the fourth repetition, in a similar fashion to the fifth graders (partial η^2 = ,376). Also in this case, it is worth noting that the observed learning effect decreased to a certain degree from VM4 to VM5, showing the same tendency as we observed for the fifth graders.

Ninth grade

Table 4 Means and standard deviations at different measuring points (VM1-VM5)

	Mean	Std. Deviation	*N*
VM1	0,023	0,007	133
VM2	0,029	0,008	133
VM3	0,033	0,009	133
VM4	0,036	0,009	133
VM5	0,031	0,009	133

  A repeated measures ANOVA was conducted to determine whether there were statistically significant differences in "Visual Memory". Due to unequal variances of data at different time points, as assessed by boxplot and Shapiro-Wilk test (p>.05), an "inverse" (or "reciprocal") transformation was applied with success. Mauchly's Test of Sphericity indicated that the assumption of sphericity had been violated, $\chi2(2)$=21,726, *p*=,010. Therefore a Huynd-Feldt correction was applied (ε= ,943). There was a significant change in "Visual Memory" (VM) over time, $F(3,771, 497,823)$=107,681, *p* < .01, partial η^2 = ,441, with VM improving from ,0233 +/- ,007 at VM1 and to ,031 +/- ,010 at VM5. The results indicate a large effect size accounting for 44.1 % of the variance in scores (Cohen, 1988; Richardson, 2011).

  Post hoc analysis with Bonferroni adjustment revealed that VM changed to a statistically significant degree from VM1 to VM2 (*M*= .006, 95% CI[.004 to .008], *p* < .01) VM1 to VM3(*M*= .010, 95% CI[-.008 to .012], *p* < .01), VM2 to VM3 (*M*=0.004, 95% CI[.002 to .006], *p* < .01), VM1 to VM4 (*M*= .013, 95% CI[.0011 to .015], *p* < .01), VM2 to VM4 (*M*= .007, 95% CI[.005 to .009], *p* < .01), VM3 to VM4 (*M*= .003, 95% CI[.001 to .005], *p* < .01), VM1 to VM5 (*M*= .008, 95% CI[.006 to .010], *p* < .01), VM2 to VM5 (*M*= .002, 95% CI[.000 to .004], *p* < .01), but not from VM3 to VM5 (*M*= -.002, 95% CI[-.003 to -.001], *p* < .05) and VM4 to VM5 (*M*= -.005, 95% CI[-.007 to -.003], *p* < .01).

The ninth graders displayed the greatest learning effect of any of the grades from the first to the fourth repetition (partial $\eta^2 = ,441$). In addition, the learning effect decreased slightly from VM4 to VM5 for these students, a decrease we also observed with the seventh graders.

The effect size estimates (partial η^2) differs from .319 (grade 3) to .441 (grade 9). The results for all grade levels indicate that there is a learning effect on repeated exercises for the participants.

Discussion
Learning outcome

Working memory improves with age. We know that pre-school children also spontaneously use working-memory strategies, and Wellman (1988) found that these strategies are goal-directed in a similar way to the strategies that are used by elder students. However, the strategies children use in first grade tend to be less effective and less suitable for given tasks than the strategies that elder students tend to use. Younger children are also less likely to use one strategy and then further develop and refine it in the same way as elder students do. Children as young as four years old are able to apply simple memory strategies by, for example, focusing visual attention only on that which is to be remembered. However, they tend to not always use the best strategies, and they profit less from use of these strategies than elder children do (Schwenk, Bjorklund & Schneider 2009). Thus, in a typical Norwegian first grade class, where the average age is six years old, it is likely that we will observe a distribution of scores in the class that can be related to maturity or cognitive ability. By organizing, or structuring information, encoding becomes easier and students also remember better.

Facoetti and colleagues (2003) have demonstrated that in children with dyslexia, the ability to read nonsense (meaningless) words are related to difficulties with visuo-spatial tasks. For example, students that strive with reading meaningless words (non-words), have been shown to visual attention related weaknesses. Moreover, those researchers found connections between dyslexia and specific visuo-spatial skills that are related to the rapid naming of abstract figures, especially when these tasks are related to the ability to process visuo-spatial information in its entirety, rather than in a piecewise fashion. Likewise, Beneventi (2010) concluded that students with dyslexia have reduced visual and auditory working memory.

In a study by Skattebo-Throndsen (2002:207) where students were characterized as «excellent», «above average» and «below average», connections were found between student performance, strategy-use and metacognition in early-years education. Notably, for the students that performed best in mathematics, recall strategies were already dominantly used in problem solving tasks in second grade, with the strategy use of these

students indicating good mathematical skills. Moreover, metacognitive knowledge about strategies and evaluation and control over calculations was also apparent for the above average students. On the other hand, the below average students made use of more basic strategies, such as simple counting strategies, and these students also displayed lower levels of metacognitive knowledge.

It is worth noting that while Tetzchner (2012) claims that children tend to be able to apply categorization strategies from the age of ten, so around third grade level, the participants in the present study also showed a significant learning effect from first grade level. This indicates that repeated presentation of visual stimuli may lead to learning effects for students of all ages.

At the same time, Siegler (1994) has demonstrated that children tend to have a repertoire of strategies at their disposition, some of which may be redundant in given situations, whilst others may be acquired. Furthermore, students' strategy choices tend to be dependent on earlier experience, the task at hand, as well as their success in using the various strategies. This gives grounds to believe that making students aware of their use of different strategies may lead to further learning gains.

Another factor that should be taken into consideration is the number of figures or symbols that are to be remembered. In the present study, the discrepancy between number of symbols in the fifth and seventh grade lead to significant differences between the two grades, with the fifth graders actually performing better than the seventh graders.

Thus limiting the number of factors to be remembered may lead to increased visual working memory capacity, which is supported by Cowan and colleagues (2014). They found that when the presented matrices are at a simple enough level, children's attentional processes can reach a level that compares to that of adults.

Repetition seems to also lead to clear positive learning effects for children of all ages. However, the learning effect for the students in fifth grade seems to be greater than for the younger students, and the learning effect seems to be greatest for the students in ninth grade. These findings support previous research that has shown that age, specifically cognitive maturity, plays an important role in children's memory.

Concretes versus abstracts

As can be seen from the results presented above, there are significant differences in children's visual short-term memory for concrete as well as abstract symbols. Students in the first and third grades need longer time, and a greater number of «moves» (attempts) in order to remember abstract symbols, in relation to concretes. This is hardly surprising in light of earlier

findings that show that children's ability to remember depends on the degree to which they are able to assign meaning to the objects. In this case, socks are recognizable objects, that children are able to code in relation to different colors, whereas the abstract symbols may be more difficult to separate from one another, therefore also creating difficulties in relation to coding.

Another possible explanation for the results is that younger children may be less able to oversee irrelevant elements, thereby creating a situation where they are trying to remember too many elements. This hypothesis may be seen in light of the study done by Luck and Vogel (1997), where they concluded that participants were similarly proficient at memorizing single objects that were related to color, size, direction or shape, as they were at memorizing objects that were only related to color or direction alone. This also suggests that memory capacity is limited by number of objects, rather than the number of visual functions that are to be stored.

The manner in which children experience their surroundings is also dependent on the ways in which they experience the visual input with which they are presented. For example, children's spatial awareness is related to how they relate to the physical room, as well as how they interpret distances, sizes and positions. While Bjørklund (2014) claims that spatial abilities contribute to our perception of surrounding features, such as connections between surfaces, lines and space, Butterworth (1999) showed that students' ability to process a long row of numbers also contains a spatial aspect that supports reasoning related to the numbers' positions in relation to one another. In other words, students' attempts to remember abstract symbols by attending to similarities, number, direction, length and position may influence their performance.

Cowen (2010) has also shown that memory capacity may be reduced when participants are unable to repeat the information that has to be remembered. This may also be a possible explanation for the difference in results for students' memory for concrete versus abstract symbols, since it is easier to name colors than abstract symbols.

While it is difficult to remember abstract symbols by combining them to form meaningful units of information, it is, however, possible to try to associate meaningless symbols with more concrete figures, for example, airplanes, birds, cubes, or the likes. The question is whether students would be able to profit from being made aware of strategies such as identifying similarities, orderly patterns, colors, number, or other useful associations.

Alexander and Schwanenflugel (1994) showed that when objects in known categories are easier to remember than objects in less well-known categories, this tends to be a result of working memory capacity being used to a greater degree to encode and organize the less well known objects. Schneider and Bjørklund (1992) also found that children that had higher

knowledge about football were able to remember a greater number of objects from a picture relating to this subject than from a picture depicting objects that could not be related to football.

Gender differences

Females tend to score somewhat higher than males on math computation tasks in elementary school, but not in high school. By the end of the 12th grade, males are slightly better at problem solving and geometry than females. Gender differences have been found in two types of spatial ability. Males tend to have better spatial perception than females, as well as a greater ability to sense horizontality or verticality, and better mental rotation ability. However, there are no gender differences when it comes to spatial visualization, or the ability to locate a simple figure within a complex one. Females however, tend to have better memories for word-lists, personally experienced events, novel associations (e.g. name-face associations) and spatial locations (Sattler 2008).

Despite similarities in performance between girls and boys during the early school years, Skattebo-Throndsen (2002) showed that girls' problem solving strategies consisted predominantly of inaccurate finger-counting strategies, but that this lack of effective strategic behavior could not be linked to a lack of metacognitive knowledge, since this was equally good in the girls as in their male counterparts.

In this study we were unable to show significant gender differences regarding visual working memory, which means that the previously reported differences between humanities students and science students, cannot be related to gender, but may rather be a result of individual preferences that form the basis of students' choice of study-path. Furthermore, differences between boys' and girls' performance in mathematics during the later school years, cannot be explained by gender differences in visual working memory, despite research showing that mathematics difficulties may be related to deficiencies in visual working memory (Adler 2007).

Limitations

Hollingworth and Maxcey-Richard (2013:1047) have shown that there is a strong relation between visual working memory and visual attention. The concrete and abstract symbols that were presented in the task appeared in the same place every time they were presented. The students that developed an understanding of this were able to achieve higher scores than those that did not, and this means that students that have been tested with similar tasks may have had an advantage over those that have not.

Self-regulation in learning situations can be related to complex processes that involve more than just the use of strategies. For example, use

of metacognition, experience-based knowledge, internal motivation, attention, and the ability to sustain attention, effort and concentration over time, factors that are closely related to mastery, are all involved. In this study however, we have not examined further possible causal relations, which may be a weakness. However, there is no reason to believe that one of the above factors would have played a greater role for one specific set of students.

Finally, we have not assessed students' performance motivation in the present study, which may also be viewed as a limitation, since motivation is closely related to students' performance. Eisenberger and Cameron (1996) demonstrated that external motivation contributes to undermining internal motivation. We cannot exclude the possibility that the students that chose to participate in this study did so because they felt that it was expected of them, thereby undermining their internal motivation to perform optimally. However, the fact that the learning profile for each of the grades is so consistent and clear, suggests that the students have all performed to the best of their ability.

Summary of results
- There were no significant between-gender differences in the visual working memory of students in different grades.
- Students in fifth grade scored better on visual working memory than students in seventh grade when they were presented with 20% fewer symbols. This indicates that reducing the number of factors to be remembered increases learning effect.
- The results from this study support earlier studies that have demonstrated that visual working memory increases with age (i.e., cognitive maturation).
- Regarding visual working memory, students of all ages demonstrated a clear learning effect related to number of repetitions.

Conclusion

Gathercole and Baddley (1993) concluded that memory capacity increases in relation to children's age, which is supported by the findings in the present study. These findings may be explained by more effective application of memory strategies, better conceptual understanding, and in older students - a larger repertoire of experiences that information can be connected to.

However, visual working memory is not only dependent on students' cognitive skills and ability. It is also dependent on their ability to use constructive strategies in specific learning situations. Unfortunately, the learning perspectives that are adopted in modern Norwegian schools are often based on a view of working memory as a fixed biological entity,

despite it being well-known that students' ability to use varied and constructive strategies is related to performance.

Once students are able to use strategies appropriately, that is, that they are applied automatically and constructively in different situations, this may become a natural part of the students' cognitive learning strategies. This suggests that opportunities for training visuo-motoric skills and spatial awareness should be provided at an early age. Children must be given opportunities to sort and group objects and symbols, find similarities and differences, as well as becoming comfortable with use of basic concepts.

Furthermore, experience is a necessary foundation regarding questions of perception, because it is easier to remember information that already has meaning. Such meanings will be based on earlier experiences that will be represented mentally, and recalled on a needs basis. Therefore, facilitating use of constructive strategies and repetition that leads to automation of such skills will influence later learning.

Finally, in relation to learning, it is also important to remember that reducing the number of units to be remembered also increases working memory capacity. This means that it is important that teachers also have knowledge of individual students' working memory capacity, as giving students tasks and work that requires working memory beyond the students' current capacity may cause undue stress and learning difficulties.

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CHANGES IN CULTURAL ATTITUDES AND BELIEFS OF FEMALE UNIVERSITY STUDENTS IN THE UNITED ARAB EMIRATES

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Abstract

Until recently college education for women in the United Arab Emirates was not considered to be an important investment, since girls were expected to stop schooling after graduation from high school, get married, and begin a family. Since becoming a nation in the past 30 plus years, however, the Emirati government has been working to ensure that all Emirates are educated through elementary school, and have launched a program to provide Emirati women a college education.   While the recognized function of education is to provide information about the world, one unintentional result is that attitudes are liberalized. This study examines 104 Emirate female college students' perceptions of changes in attitudes, and expectations for their futures. A questionnaire was developed specifically for the study. Results show that attitudes about family relationships and friendships are undergoing change, as well as expectations for future employment.

Keywords: Culture, attitudes, beliefs, higher education, change

Introduction

Rapid shifts in national development from a traditional to post-industrial society affect cultural attitudes and beliefs (Inglehart & Baker, 2000) and the sense that one belongs to a particular cultural group (Dhaouadi, 2002). Changes in cultural identity and corresponding attitudes and beliefs are complex and influenced by different factors, one of the most important of which is modernization (Goode, 1963; Hitlin, 2003). Several studies have found associations between modernization and changes in cultural identity, and have identified factors of modernization that affect cultural identity such as education, and media (Khalaf and Alkobaisi, 1999;

Thompson, 1999; Esposito, 2003; Schvaneveldt, Kerpelman, & Schvaneveldt , 2005).

This research examined university women's educational experiences as they are related to changing attitudes and beliefs. Specifically, the study examines the relationship between gaining an education at the college level, and expectations for future plans, attitudes towards relationships with parents, and exposure to non-western media and western media.

Review of Literature

In the past thirty plus years, the United Arab Emirates (UAE) has undergone socio-economic and political transformations (Findlow, 2000) associated with modernization. One factor strongly affecting cultural attitudes and beliefs of United Arab Emirates females is education and work. In the past, Emirati women's education was limited. However, since the early 1970s, the United Arab Emirates has made great advances in modernizing its educational system, giving women opportunities to achieve a high school diploma, and attend colleges and universities (Heckman, 2000; Ministry of Information and Culture, 2014). From the onset, the UAE constitution was formulated to safeguard the rights of women by providing them equal opportunities. Women therefore have the same legal status, claim to property, access to education, and the right to practice any profession (Halloran, 1999; Ministry of Information and Culture, 2014). With an increasing trend in mothers being in the workforce there appears to be a supporting shift in values. (Abdel-Rauf, 2000).

By completing their education, more Emirati women are asserting their intentions to enter the labor force and choose their futures (Crabtree, 2007; Schvaneveldt, Kerpelman, & Schvaneveldt, 2005). Women's education and participation in paid work are overcoming barriers to traditional roles and activities for women and are bringing new cultural attitudes and beliefs (Ministry of Economy, 2007; Ministry of Information and Culture, 2014; Devriese, 2008; Crabtree, 2007; Schvaneveldt, et al., 2005). Crabtree's (2007), analysis of in-depth interviews with Emirati mothers and daughters found that the young women are expecting to work outside the home, and this expectation is shared by the mothers. UAE parents recognize the importance of the availability of educational opportunities provided by the government. Some progressive Emirati national parents encourage their children to adopt modern ideas within the limits of religion. Conversely, conservative parents tend to not accept modern changes within the culture and often have more control over their children's activities, including dress, associations with friends, and choice of a suitable subject to study in school (Inglehart & Baker, 2000). Madsen (2010) found that UAE

professional female leaders had open minded fathers, strong higher education and strated reading books as a yound child.

Along with education and work, media are important agents of cultural identity formation (Jendli & Khelifa, 2004). Exposure to foreign media may influence Emirati women's ideas, attitudes, and behavior. Women may mimic media role model images of assertiveness and expectations of equality with men. Media may influence people, especially women, to advocate for human rights and to call for changes in society (DeVriese, 2008). Historically, Emirati women did not work outside their homes. However, in recent years women have begun working in jobs that are viewed as "women's jobs" and include teaching and school counselor at girls' schools. With the influence of modernization, including education and media images of women's possibilities, women have sought employment in private and public sectors including multinational companies where they work and compete with men (Al-Ali, 2008).

Traditional values of family and obedience to parental authority (Inglehart & Baker, 2000) are changing and Emirati youth are beginning to identify themselves as individuals, to seek what is best for them, and they are beginning to change the long held traditions associated with belonging to an extended family group and conforming to the advice and demands of family authorities. One example of this change is the establishment of nuclear families when couples marry. Historically, couples would reside with the husbands' families rather than begin married life on their own (Citizenship and Immigration, nd). This new practice disrupts family cohesiveness and intimacy. Traditionally, women were not allowed to exit the home compound without being accompanied by a male relative, even if that relative was a young son. This traditional practice is changing, and women are allowed to venture outside the home with female relatives. Additionally, as the young women attend college, they are forging friendships with non-related women, and are expanding their relationships to include expatriates, including expatriate male teachers.

Methodology

This research was conducted at a government supported university for Emirati national females, where instruction is in English. Initially, the university was designed to educate Emirati women, who, because of travel constraints, could not attend universities abroad. In recent years the university has opened it's doors to international students and to males. There are campuses located in Abu Dhabi and Dubai. Student's can earn Bachelor's or Master's degrees.

To investigate changes in cultural attitudes and beliefs 104 female students between the ages of 17 to 36 years of age (mean age 20 years) from

a UAE University completed an online questionnaire in English. Survey items included demographic data of age, which emirate they grew up in, whether they attended public or private school prior to entering the university, family income ranging from low to very high, marital status, current classification ranging from 1st year English language readiness (and thus to have just begun their education) to 2nd year in the major (and therefore likely to graduate in that year). Students were asked about their parents' ages, which country their mother was from, parents' educational level, and in which country their parents were educated. To measure change in cultural beliefs and practices students were asked about their appearance preferences in public, their perceptions of personal autonomy and independence, and exposure to and influence of media.

Results

Less than half the students (41.4%) grew up in the progressive and liberal Emirate of Dubai, and about the same percent grew up in the large, but more conservative Emirate of Abu Dhabi (44.2%). The remaining 11% grew up in smaller, traditional and conservative emirates, and 3% grew up outside the UAE. Over half (58.8%) attended public school before entering the university and 41.2% had attended private school. Ninety-two percent were never married, 3.9% married, and 3.9% separated, divorced or widowed. Nearly nine percent (8.8%) were in the readiness program, 47.6% were in general education (first 2 years of their education after English readiness), and 44.1% were in first or second year of their major. No students reported their family income was low, 53.4% said their family income was average, 37.9% said it was high, and 8.7% said it was very high.

Parental age could be a factor in non-traditional cultural values and beliefs with younger parents establishing a more liberal home environment. Parents' ages ranged between 30 and 57 for mothers and 39 to 70 for father, with mean maternal age of 46.1 and mean paternal age of 54.8. Maternal origin may be associated with cultural values and beliefs. Mothers from more modernized countries may impart their orientation to their children. This may also signify a more modern orientation of fathers as well. Eighty-two percent of mothers were Emirati, 8% originated in other Gulf nations, 6% in other Arab countries, and 4% originated from Iran or India. All fathers originated from the UAE.

Educational attainment is associated with liberal outlooks and may be brought into the home environment. Ten percent (10.8%) of fathers were unschooled, 36.9% had achieved primary school only or had graduated from high school, and 52.4% had either some college or graduated with a bachelor or graduate degree. Among mothers, 12.6% had no education, 56.3% had

attended only primary school or had graduated from high school, and 31.1% had attended or graduated from college with a bachelor or graduate degree.

Country of receiving one's education may influence traditional cultural attitudes and beliefs because those educated in Western countries were exposed to the progressive and democratic social orientations of their host countries. Among fathers who had attended school, 54.8% were educated in the UAE, 4.4% received their education in another gulf country, 25.3% in the U.S., the U.K. or Europe, 14.3% in other Arab countries, and 2.2% were unspecified other countries. Among mothers who were educated, 65.7% were educated in the UAE, 10.8% were educated in other Gulf countries, 3.9% had been educated in other Arab countries, 2.9% had been educated in Iran or India, and 3.9% received their education in the U.S. or U.K.

In describing their home environment, over half of the students (55.5%) said it was modern or very modern, and 38% said their relationship with their fathers was open or very open, whereas 50% said their relationship was not too traditional or too open. Brothers, whether younger or older, have as much authority over their sisters as fathers. Sixty percent of students described their relationship with their brother as open or very open. Two thirds (64%) said their relationship with their mother was open or very open.

Students were asked about their autonomy in deciding their future because of their education. Nearly all students (95.1%) said because of their education they would decide if they work and 96.0% said they would decide where they will work. However, 73.0% said they would decide if they will work in a work setting with men, and the remaining one quarter of the students leaving that decision to their families. Nearly half (45.5%) agreed with the statement that because of their education they decide who their friends are, and 54.5% agreed that because of their education they decide when they see their friends. This finding illustrates the transitional process of these students' autonomy. Nearly three quarters of students (70.4%) agreed that because of their education they would decide who they would marry. Overall, 90% said that because of their education, in general they decide for themselves. This finding suggests that while the students expect family influence in some aspects of decisions about their lives, in general they believe they have the autonomy to control their lives.

In modernized societies women typically delay marriage and childbearing until after they finish their education and get their career started. Traditionally among the UAE nationals marriage typically occurs when a young woman under the age of 25 and the first child is born within the first year of marriage. Among non-married students in the sample, 54.4% said they would not marry until after they graduated from the university, and 29.4% said they would marry after they got started in their career. Among

students who did not have children at the time, 53.2% said they would have babies after they graduated, and 40.4% said they would have babies after they got started in their career.

It appears that the students in this study have more liberal or progressive relationships with their parents and brothers than traditionally expected, as changes were reported in relationships with fathers, brothers and mothers. Emirati families are extended and close-knit. Daughters traditionally are close with the other females in the family, while fathers and brothers traditionally wield strict control over the females. Families typically do not socialize with non-family, and spend much of their work and leisure time in the company of family. It is notable that nearly half (45.5%) of students assert that their education enables them to decide who their friends are and over half (54.5%) said they decide when they see their friends. Use of cell phones and internet access may contribute to social connections outside the extended family. Also of note is the finding that one third (35%) of students said they speak English more than Arabic with their friends. Using English conversationally with friends suggests further cultural change.

Just over half of fathers had attended or graduated from college with one fourth of them having been educated in the US, UK, or Europe where ideas, behaviors, and values are generally more liberal compared with the UAE, suggesting that the home environment may be influenced by paternal foreign experiences.

Access to the media may also be influencing cultural changes. About half the students said they thought they were influenced by Western media (47.4%) and in a separate question about half (42.9%) said they thought they were influenced by Westernized Arabic media. This influence is experienced through satellite TV, radio, internet, and print media. Examples students provided of how they were being influenced included food choices, the way they dress, being more outspoken and creative, being more open and accepting of others and being open-minded. Students also said they were influenced in their knowledge about other cultures and global events.

Conclusion

Access to education and the various forms of media, coupled with elements of their home environment appears to impact female students at Zayed University, the Emirati national university in the United Arab Emirates that has a mission of educating Emirati women. The women in the study may be in the initial stages of departing from traditionally held cultural attitudes, values, and beliefs. The findings from this study indicate that the majority of female students' cultural perspectives are evolving from the more socially isolated and subordinate role that, until recently, was the dominant

way of life for Emirati females. The UAE federal government's position on the role of women asserts that women are expected to take their place in the developEment of the country, and that they are to be educated and engage in paid work. These social realities have implications for delaying marriage and childbearing as women enter colleges and universities and move into careers after graduation. The majority of students believed that their education provided them with a sense of autonomy and independence and they believe they have control over their futures, including when and with whom they would marry, and the timing of childbearing. They also expect to decide if they will work, as well as conditions of the working environment.

With these emerging changes in cultural practices, beliefs and values the UAE will continue to modernize. The female students of this study will integrate new cultural practices into their traditional Emirati culture, and most likely each new cohort of female college students will continue to expect to enter the professional force work and make decisions about how their lives will be. In the transition period between traditional and modern and being caught between old and new, the students in this study still wanted to get married, have babies and develop a career. As with women in the West they, too, will learn how to balance work and family. Although the mainstream culture lags behind in changing attitudes, beliefs, values and practices, a new generation of female college graduates expects changes are happening, and they will instill these new cultural ideas into their children.

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THE FULL CIRCLE:
CASE TEACHING AND WRITING IN BUSINESS COURSES

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Abstract

While including case studies as part of the curriculum is widespread in business education in North America, and to a lesser extent, in Europe; in the emerging economies this instructional approach is still novel. Furthermore, case writing, has been traditionally the realm of the instructors, and sometimes graduate students - even in the most developed educational institutions. In this paper I present a "full-circle" approach to case teaching and writing whereby undergraduate students are involved in all parts of the case experience. The paper presents a specific theoretically grounded methodological framework, and describes the results of its successful implementation at the American University of Cairo and the American University of Beirut during the period 2010-2014. Overall, 17 cases accompanied by teaching notes co-authored by students were published by Ivey Publishing, Pearson, McGraw-Hill and peer reviewed academic journals. Involving students in creating educational materials for their peers has proven to be a novel and rewarding experience for all parties involved.

Keywords: Case method, business education

Introduction

Using cases in business education is not new. Effective case teaching offers students the opportunity to grapple with the complex nature of decision-making in an international environment. Despite being a very significant benefit of using cases in the classroom, it is but one of many. In this paper, I argue that the benefits can be extended significantly beyond learning the content of course material, and beyond the scope of a single course. Taking a long-term (life-cycle) perspective on cases may help not only enhance immediate learning, but also create a closer connection between stakeholders (students, companies, instructors) with synergetic benefits to all parties:

- **Students-writers** may enhance their resumes with published works and employment perspectives with the focal companies.
- **Students-solvers** would feel more affinity with cases written by their peers, and covering their own region.
- **Focal companies** would receive not only a detailed research on possible countries – targets for expansion, but also an access to the best students willing to extend extra effort.
- **Instructors** could benefit from better student evaluations (as a result of a more rewarding class), case authorship, collection of material for a qualitative research paper (4 cases is enough according to Yin, 1990) and consulting opportunities with focal companies not to mention the intrinsic satisfaction from seeing the students learn and success.

I.
Rational for the use of case teaching and writing in business courses[1]

What I hear, I forget; what I see, I remember; what I do, I understand
- Chinese proverb

In a changing environment, the human ability to learn is fundamental for adaptation. Indeed, in the modern world of continuous, rapid change, effective learning and innovation may be the only sustainable competitive advantage (DeGues, 1988). Participative educational methods stimulate both cognitive and behavioral types of learning, leading to a higher level of knowledge and skills acquisition (Inkpen and Crossan, 1995).

The Socratic method of participative learning has been known since antiquity. Almost a century ago, the Harvard Business School chose the case method as an effective way of teaching business. Today cases are taught around the world in a wide variety of disciplines.

> *"A case is a description of an actual situation, commonly involving a decision, a challenge, an opportunity, a problem or an issue faced by a person, or persons in an organization. A case is based on actual field data, authenticated by a release. It is not an armchair or fictional variety."* (Erskine, Leenders & Mauffette-Leenders, 2003: 9).

Although the method is drastically different from the traditional classroom lecture style, it should not be perceived as an "all or nothing" proposition. Instead, it is highly beneficial to provide diversity in the learning experience – lectures, problems, exercises, experiential learning,

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[1] Based on Apaydin, M. (2008), "Making a Case for the Case Method in Turkey," *Journal of Management Development*, Vol. 27 No. 7, pp. 678-692.

problem-based learning, simulations, games, films, field trips or any other teaching technique. The benefits of integrative learning, which includes both cognitive (changes in beliefs) and behavioral (changes in behavior) components, have been pointed out by many scholars (see Inkpen and Crossan (1995) for a summary). The case method develops key skills that would be immediately useful to the graduates starting their management careers: analytical, decision-making, time management, oral and written communication, creative, interpersonal and social skills (Mauffette-Leenders et al., 2005).

Glasser (1986) notes that we remember 10% of what we read, 20% of what we hear, 30% of what we see, 70% of what we discuss with others, 80% of what we experience and 95% of what we teach to others. Small group discussion is especially important in this regard as it allows participants to develop communication skills, foster effective teamwork, develop relationships, build confidence and teach others, thus pushing the knowledge absorption to the maximum.

Case writing may be perceived to be more challenging than simply learning with cases, but it may also be more rewarding, especially in the long term. The process of writing not only a case, but also a teaching note, which includes advice for the instructors how to teach the case, suddenly puts students in the shoes of their teachers – a position they rarely if ever think about. Not only does it provide them with new insights into the class material, it also increases the retention levels (as suggested by Glasser 1986). However, the benefits of case writing extend much further than the time and scope boundaries of a class. A well written case can be published either as a stand-alone paper by any one of the case publishing outlets and academic journals. or can be included in the appropriate academic textbooks, as it will be explained in sections below. The best cases get awards and recognition, and can be featured in students' resumes and CVs as a point of differentiation with respect to other candidates.

The following sections explain specific approaches of case teaching and writing which were implemented by me in Lebanon, Egypt, China and Turkey.

Case teaching in international business (IB) or strategic management courses

The following approach is based on my 3A framework (Awareness, Analysis and Action) of student learning (Apaydin, 2014). It was developed and implemented in IB and strategic management courses. The case component usually represents between 20% and 30% of the course grade and includes a preparatory workshop and 3-5 case assignments to be prepared as Power Point presentations followed by a class discussion.

Before starting any case work, the students have to attend a 3 hour **Case Solving workshop** where they learn a systematic approach to decision-making and necessary resources to solve cases. This workshop is based on Ivey School of Business methodology described in Mauffette-Leenders et al. (2005).

CPC – case preparation chart

CPC is a one page map to guide students in individual preparation (see Exhibit 1, adapted from Erskine et al., 2003). It starts with defining and prioritizing the issues, followed by data analysis, and selection of alternatives based on specific quantitative and qualitative decision criteria. It ends with a development of implementation plan, specifying missing information and stating assumptions.

CPC has discrete parts that require diligence in execution, and it has an underlying logic that connects all the parts. CPC is graded based on 1) completeness; 2) diligence; 3) data use; 4) logic.

Exhibit 2 presents the framework of case teaching in the strategic management course with identification of the practical skills learned in each module of the course. The detailed explanation is below. The following 3 cases represent the core of the strategic management course.

Starbucks (Ivey Publishing) offers an opportunity to decide on possible growth options: domestic vs. international expansion. After discovering a poor quality Starbucks coffee at a university franchise store, CEO receives an offer from McDonalds. Pressured by investors' expectations of high growth, the CEO has to choose where and how Starbucks can grow: should they focus on the domestic (US) market or go abroad? And if yes, where to? It's a good introductory case given students' familiarity with the brand, which gets them easily engaged with such questions as: what do we buy at Starbucks: coffee or experience? At the same time, the case is rich in data and can be taken to the highest level of analysis and strategic decision-making.

Assignments
- **Prepare CPC individually**
- **Prepare Power Point Presentation (PPP)** as a team to evaluate Starbucks' growth options
- **A general class discussion** about issues in the case (growth options and the value chain).

Internationalization cases from Egypt (Pearson). Three Egyptian companies decide to expand internationally into 2 countries. El-Sewedy (electrical equipment) is thinking about Italy and Spain, Moderna (textiles) aims at Syria and Jordan and Prime Group (financial services) would like to

go to Saudi Arabia and Morocco. Three different industries have different structures and success factors and reveal different decision criteria which need to be taken into account when internationalizing. However, each of them can also teach students about rarely studied connection between the subsidiaries themselves. E.g. Spain becoming a distribution hub for Italy and Europe for El-Sewedy, Syria – manufacturing platform for Moderna, and Saudi can supply clients for Moroccan financial market.

Assignments

- **Prepare CPC in pairs** (each pair – for 1 case, trying to have equal number of teams for each company)
- **Prepare PPP** (same as Starbuck) – if too many students in the class – each team analyses only 1 country, or 2 teams do 1 country. The idea is not to have more than 6 presentations.
- **A general class discussion** about issues in the case (8 modes of entry).

Nestle-Rowntree **(IMD) offered at the end to consolidate all aspects of the course, including skills learned:** I call this case "the Chocolate wars." As a result of poor performance, a UK leading confectionary producer Rowntree becomes an acquisition target. Two Swiss companies (Nestle and Suchard) compete to get this "sweet" deal. This is a very complex case, with a lot of data, different currencies, government involvement and a real-time race to win. It can be used at the end of the course to teach various aspects of global strategy implementation; it also can involve game theory, and negotiations.

Assignments

- Prepare different analyses of macro, industry and company and present in class (half of the class on behalf of Nestle, another – on behalf of Rowntree, teams of 3 or 4)
- Prepare and present **negotiation strategy**, each team focusing on a different issues: 1) what environment needs; 2) what resources can deliver; 3) what management wants
- Conduct **live negotiations** in class (each team selects one person to represent 1 of 3 members of the management team listed in the case).

Cases' evaluation by students

The student survey found that students appreciated all the cases almost equally with a slight preference for Nestle-Rowntree because it had an interactive negotiation component and a video.

Teamwork evaluation

Team assignment is done based on gender and performance diversity, new teams are created for each case. Therefore, up to a dozen of classmates (depending on the class size) can evaluate a student as a teammate at the end of the course.

Case writing in an IB and strategic management courses

Case writing was implemented by me in IB and strategic management courses at both graduate and undergraduate levels at the American Universities of Cairo (AUC) and Beirut (AUB). The case assignment was based on the course project suggested in the IB textbook (see #3 in Exhibit 3) and based on Ivey guidelines in the strategy course.

The project consisted of the following parts:

- **General home country** (Egypt or Lebanon)
- **Business Environment Analysis Report** for two countries in which they plan to expand.
- **Market Entry Strategy Analysis** – target market assessment, sales forecast, entry mode selection and international strategy development.

Case writing was offered as an option that would enable the students to gain additional/better grades than a standard project. The main difference with the project was that the students should have taken a case writing workshop based on Ivey methodology and the write their project content within the frame of a Case and a Teaching Note. The latter was especially challenging given that they suddenly have to "teach" the course instead of learning it.

During three semesters at AUC, 18 cases were written by undergraduate students out of which 5 were published by Ivey Publishing and Pearson (see #4-5 in Exhibit 3). Four cases were written by MBA students at AUB during a short summer semester 2012 (3 weeks). One of them was published by Ivey Publishing and another by McGraw-Hill. CSR-related cases dealing with stakeholder management for regional heritage sites and local companies were written by 5 undergraduate teams at AUB for their strategic management course in Spring 2014. They are currently being prepared for publication.

Publication opportunities

There is a variety of outlets where student cases can be published, which range from main case warehouses (Ivey and ECCH), to academic publishers such as Pearson, McGraw-Hill and Centgage, to specialized case journals. Additionally, cases can be submitted for conferences and

competitions. More information can be found on MENA Regional Case Initiative website:

http://www.aub.edu.lb/osb/menarcci/activities/Pages/PublishingCases.aspx
http://www.aub.edu.lb/osb/menarcci/activities/case_competitions/Pages/case_writing_competitions.aspx

Long-term impact beyond learning about business

Learning with cases and writing cases provide long-term benefits to the students beyond the scope and the time of a business course:

- Students improve their awareness and understanding of the globally connected world;
- Students develop analytical and quantitative skills which can be applied in other domains;
- Students get prepared for case-based interviews usually administered by consulting and large international companies during recruiting process;
- Students improve their resume/cv with published works;
- Students get connections with local companies and better chances for employment.

Two AUC students (the authors of El Sewedy and Azza Fahmy cases) have offered their reflections about the experience of case learning and writing.

> *Change is so constant in one's life that it is barely noticeable unless it is a turning point. I took the challenge of writing a case of my own free will, and despite the effort and hours put into it I thought that the challenge would be worth it – and eventually it was. Writing this case and having it published, was a turning point in my life, which made me realize that I have the will power to do anything I can, if I give it my full attention and have the motivation to go through with it. In addition to that it made me realize that having this case published is a competitive edge that makes me compete with peers across the globe.*
>
> *As promised, Sewedy did proceed with foreign investment after the revolution to sustain profitability.*
>
> *The company I work for does a lot of business with Pearson, who are currently marketing their "Arab Edition" text books, and every time I see them in a meeting I never fail to brag that I wrote one of these cases and helped in editing a few of them – it does make a difference.*

Maha Eshak, *AUC Bachelor of Business 2010*

> *Through my studying at AUC, I solved many cases which helped me in different ways. First cases allowed me to apply different*

management and marketing concepts in real life situations. It also helped me to realize variety of situations that companies confront in real life and how to overcome them. Having a real-life situation, with no specific solution to the issue tackled in the case, broadened my thinking and allowed me to come up with different alternatives to solve this issue. Learning with cases also made me analyze various factors in the company's environment which could affect the decision. Moreover, solving cases provided me with the opportunity to take the decision-maker role in a safe environment where error is acceptable. Reaching different alternatives to solve an issue also helped me to weight these alternatives based on various factors and select the best one. Finally, through cases, I learned that there is no specific right answer. The most important thing is to analyze the situation internally and externally, consider different variable, come up with alternatives, weighing each and choosing the one that fits the situation best.

Hend Mostafa, *AUC Master of Business Administration 2010*
(see #8 in Exhibit 3 for more student feedback).

Creating a full circle system: students – company – instructor – students
In addition to the benefits to the students described in the previous section, instructors and companies also benefit from case writing:
- **Focal companies** would receive not only a detailed research on possible countries – targets for expansion, but also an access to the best students willing to extend extra effort.
- **Instructors** could benefit from better student evaluations (as a result of a more rewarding class), case authorship, collection of material for a qualitative research paper (4 cases is enough according to Yin, 1990) and consulting opportunities with focal companies not to mention the intrinsic satisfaction from seeing the students learn and success.

Theoretically grounded, practice-based contextualized **materials for interactive instruction**

Cases

Experts

Regional faculty and teaching assistants trained in **interactive educational methods**

Practices

Theoretically grounded contextualized **best educational, business and policymaking practices**
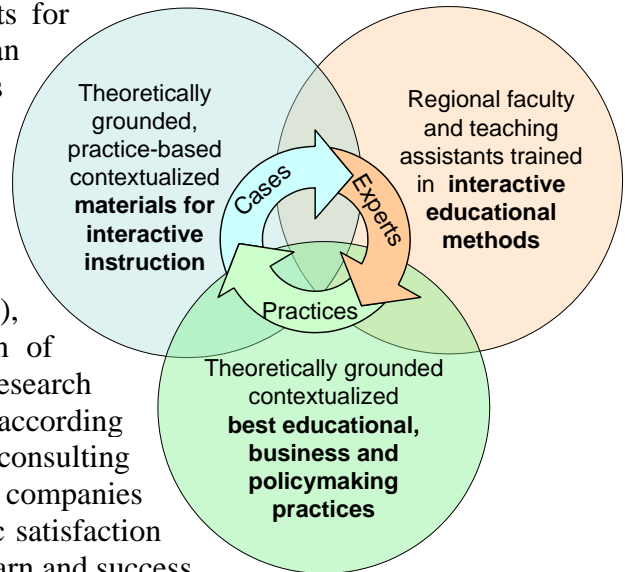
Overall, Cases create mutual benefit and develop interconnections of all stakeholders: students, instructors and companies as illustrated in the chart above.

Success stories: *"The Life of a Case"[2]*

I am a case. I now proudly stored at the huge electronic database hosted somewhere together with thousands of other cases from all over the world. But I am special, because I am the first one written by the undergraduate girls from Egypt. I describe El Sewedy, an Egyptian cables company. Who could have thought that young girls would ever be interested in writing about something so technical as cables! One of them approached the owner of the company, Mr. El Sewedy with this idea. Luckily, Mr. El Sewedy, an AUC graduate himself, had a large soul and never missed an opportunity to help the students of his alma mater. In discussions with Mr. El Sewedy, the students decided to explore a possibility for the company to expand into Spain and Italy. Many hours and sleepless nights later, I was born. And then I was groomed a number of times to meet the high standards of Ivey and Pearson Publishing. Meanwhile, Mr. El Sewedy, utterly impressed with girls' work hired one of them as an Assistant to the President.

A few month later, as the Egyptian Revolution erupted together with other upheavals in the Middle East, and El Sewedy business in the region collapsed. Luckily, I was there with all the necessary data for the company to make a quick decision and expand. And so I feel like a savior… Without me, the future of the company wouldn't be so bright, or is it too bold for me to think so?

My adventures didn't stop there. The professor who had the idea to let her students experiment with case writing moved from Cairo to Lebanon. Meanwhile, Pearson published me in the first Arab edition of the Strategy textbook. And guess what, my dear readers? As the professor arrived in Beirut, this very book was adopted by the course coordinator to be used in the capstone course. And so, now Lebanese undergraduate students were learning IB strategy based on a case written by students as themselves. Not only that, one of the authors came from Egypt and talked to her peers about the experience. And of course, I was the center-piece of this talk. How can I not be proud?

Opportunities for the future

The success of this innovative educational project clearly demonstrates that students are capable and enjoy challenging tasks, given

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[2] This part was written using "first-person account" style, which can be found in literary works such as Nobel Prize winner Orhan Pamuk's "My Name is Red".

that they are provided a clear structure, guidance and can benefit from its outcomes. Possible extensions of this project can be creating a multiplier effect by enabling more experienced students teach new students. This will not only create continuity in learning but also increase the amount of regional learning materials we lack.

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Exhibit 1
CASE PREPARATION CHART

Case Title:

Exhibit 2

Case Assignment: **COURSE**

I. SHORT CYCLE PROCESS

II. LONG CYCLE PROCESS

	Name	*Position*
Who:		

C. Alternative Generation

1. **STRUCTURE**
2. **AND SKILLS**
3.

Issue(s)

What:

D. Decision Criteria

DEVELOPMENT

1.Quntitative….
2.Qualitative….
3.Importance of criteria

Why:

E. Alternative Assessment

When:

Criteria	Cr1	Cr2	Cr3	Weighted
Weight				Total
Alt 1				
Alt 2				
Alt 3				

How:

II. LONG CYCLE PROCESS

F. Preferred Alternative

Predicted Outcome

A. Issue(s)

G. Action & Implementation Plan

Immediate	Basic
1.	1.
2.	2.
3.	3.

	Timing
	Milestones
Who	
What	
When	
Where	
How	

Importance

	Low	High
Urgency Low	I	II
High	III	IV

Missing Information

Assumptions

B. Case Data Analysis

Exhibit   **2**

PRACTICAL LEARNING

SKILLS DEVELOPMENT

CASES

STARBUCKS (Ivey)
To learn Ext-Int-Choice aspects
≅   Easy connection with students as they
     are familiar with the outlet (next door to
     AUB)
≅   Has a lot of details about external and
     internal environments, thus enable data-
     based analytical approach
≅   10 year best selling Ivey case

3 EGYPTIAN COMPANIES (Pearson)
To learn about global strategies
≅   Local context, recent cases
≅   Different industries (manufacturing,
     textiles, finance)
≅   Expanding into 2 different countries
     Spain/Italy; Jordan/Syria; Saudi/Morocco)
≅   Written by AUC senior students (like
     ours) and published by Pearson

NESTLE-ROWNTREE (IMD)
To learn about M&A and strategic change
≅   Known company – can relate
≅   Case rich in data
≅   Requires analytical work
≅   Involves negotiations
≅   Has a video
≅   Enables role play

≅   3A (Awareness, Analysis, Action)
≅   Improvisation
≅   Listening skills
≅   Networking
≅   Analytical skills (definitions)

≅   Communication skills
≅   Teamwork
≅   Analytical skills (decision-making, CPC)
≅   Diligence and logic, causal relations

≅   Presentation skills
≅   Analytical skills (data analysis)
≅   Research skills (working with data
     sources)

≅   Analytical skills (argument building)
≅   Negotiation skills

Exhibit 3
ADDITIONAL RESOURCES
Ivey Publishing website:
 (*https://www.iveycases.com/CaseMateBrowse.aspx?CM=7)*   a   CaseMate
tool which suggests international business cases for instructors' textbook of
choice (overall 30 different textbooks are matched with cases).
Middle East and North Africa Regional Case Center Initiative website:
(*http://www.aub.edu.lb/osb/menarcci/)* – features a comprehensive list of
cases from the region available online from all electronic sources
"International Business: Global Edition" 14th edition (2013) by Daniels,
Radebaugh & Sullivan (Pearson) features a course project which can be
converted into case-writing.
 (*http://catalogue.pearsoned.co.uk/educator/product/International-Business-*
Global-Edition/9780273766957.page)
"Strategic Management: Concepts and Cases" (Arab World Editions)
(2011) by Ali, Al-Aali, David, Ali & Al Aali (Pearson) features 3 cases
written by AUC students
(http://catalogue.pearsoned.co.uk/educator/product/Strategic-Management-
Concepts-and-Cases-Arab-World-Editions-with-MymanagementLab-Access-
Code-Card/9781408289631.page)
Ivey Publishing: other IB cases written by AUC/AUB students
"El Mawardy Jewelry":
 https://www.iveycases.com/ProductView.aspx?id=51412
"Orascom telecom":
https://www.iveycases.com/ProductView.aspx?id=51343
"Jabwood International":
 https://www.iveycases.com/ProductView.aspx?id=56454
The American University of Cairo – School of Business
(http://www.aucegypt.edu/Business/Pages/default.aspx)
The American University of Beirut – Olayan School of Business
(http://www.aub.edu.lb/osb/)
Student feedback about the IB course with case writing component
(http://www1.aucegypt.edu/faculty/marina/alumniNet.html#student_INTB30
1)

IMPACT OF INNOVATIVE LEARNING ENVIRONMENT BASED ON RESEARCH ACTIVITIES ON SECONDARY SCHOOL STUDENTS' ATTITUDE TOWARDS RESEARCH AND THEIR SELF-EFFICACY

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Abstract

  Advanced and free learning environment coupled with the creative learning activities is assumed to be a motivational variable. In the present study, we applied an innovative learning strategy involving students in order to achieve positive impact on their attitude towards science, desire to learn science and future career choices. The study experiment was focused on enhancing the research skills of the students; apply knowledge for solving real world problems, positively changing the students' attitude towards science, raising students' self-efficacy and enhance positivism toward science related subjects. This research assumes that if the attitude and perception of post-secondary students is changed and made positive about science, then they might choose to study related science subjects for-example, mathematics, engineering and science at university level studies. Therefore, it will also impact students' career choices after university studies and they might enter scientific careers. Our study focused on evaluating various changes in the attitude, desire and self-efficacy of participating students when traditional instruction is replaced through the innovative learning environment. A total of 120 students participated in our experiment where researchers assisted students to experience hands on different research activities. Pre and posttest were used to evaluate the change in students' attitude and desire towards science, knowledge and self-efficacy. The study

results have shown that significant changes in the performance of students' for-example, student noticed positive attitude towards their own research abilities, desire to learn science, self-efficacy, learning and career choices. However, results did not show any differences based on gender as such.

Keywords: Career choice, desire to learn, innovative learning environment, self-efficacy, student attitude

Introduction

The emergence of developmental projects coupled with the globalization of the labour market has led to the emergence of newer economic sectors. Such newly emerging economic sectors have different requirements in terms of the workforce. Since these new sectors, demand workforce having skillset which is interdisciplinary in nature and also include technical subspecialities. Considering the occurrence of these changes, in Arab region especially Gulf states have recognized the importance of knowledge-based economy. This is quite evident by the active planning initiatives undertaken by Gulf nations for making transition to the knowledge-based economy.

However, at present the gulf countries are facing the shortage of skilled labour force. Furthermore, this problem is aggravated due to shortcomings in their present educational setup. The most remarkable challenge is the existence of the mismatch between the labour market requirements and the educational outcomes. The present educational sector is proving to be incapable in adapting itself with the developments occurring in the labour market leading to the failure in producing the specialized workforce and scientific professionals that are much needed by the industry.

First and foremost, the major problem faced by the economy and labour market of the Arab region is the continuous decline in the number of educational outcomes of the micro scientific disciplines. Secondly as mentioned previously, the Arab educational curricula is proving to be insufficient in providing students with the skills matching the developments occuring in the existing labour market (as indicated by the Arab knowledge report 2010/2011). Such a situation is significantly contributing towards hindering the economic development of the Arab countries. In this regard, the Arab knowledge report (2010/2011) suggests education policy makers to take important and necessary steps for changing the existing educational curricula in terms of content and methodologies. It stresses on having an educational curricula that has a professionally orientation. The new educational curricula should provide upscale and sophisticated knowledge that corelates with the requirements of the constantly changing trends of labour market. Additionally, the provided knowledge should be applicable

beyond the boundaries of national economy meeting the demands of the global labour market[3].

Trend in International Mathematics and Science Study (TIMSS) results revealed that on average the grade 8 students in the Arab region attain significantly lower scores than their counterparts in the United States (Michael et al. 2011). However in context to Arab region, TIMSS results also reflect that female students are better in science than males (Timms201: 167). On the other hand, results from United States presents an opposite view where males are better than females in science. On the general note, it can be concluded that Arabic young generation is less likely to major in disciplines related to mathematics and science when they reach higher education.

The present study has been conducted on the students in the Qatar University. The aim of the study was to test and explore the capabilities of a non-traditional learning strategy in improving the learning performance of the students. Furthermore, applicability of this learning strategy will also be tested with regards to fostering the sense of self-efficacy and generating positive attitude among students towards science. The purpose of this study is to explore, test and evaluate the impact of practing innovative learning environment with students on their attitude towards science and possible career choices. In this study experiment, a non-traditional learning strategy was practiced with students who were exposed in new ways of learning and closely worked with researchers on different assigned problems.

Theoretical background
"Self-Efficacy"

The sense of self efficacy reflects one's belief or confidence of experience success. The substanial body of research has recognised the positive perceptions in context to self-efficacy as one of the major determinants while making career choices. Albert Bandura (1977) explained the learning process in the terms of the causual conditions affecting it from the individual perspective. In this regard, he discussed the effects of the educational curriculum on the development of the psychologcal and cognitive aspects of the students. From the viewpoint of social cognitive theory, Bandura (Bandura, 1977:191-215) also pointed out the factors causing behavioral changes as the sense of self-efficacy can be acquired through the means of the education. Furthermore, the explainations of the

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3 - The statistics which included in the Arab Knowledge Report 2010/2011, preparing future generation for the knowledge society, showed high unemployment rate among Arab youth, these facts showed also by, Arab Human Development Reports 2002 -2012 which indicated that there is still a high rate of the Illiteracy between the young generation beside inability to provide the required investment to advance the economies of the Arab countries.

learning process stress that the preceived self-efficacy reflects individual's attitudes, abilities and cognitive skills (Bandura, 1977:191-215). Over the period of three decades beginning in 1977, Pandora developed a cognitve theory that explains the different social and individual factors effecting the human choices and their ability to judge things. The proposed cognitive theory also uses the concept of self-efficacy as the main factor that enhances individual's perceptions about their abilities and their chances of success. Furthermore, Pandora (xx) states that the perceived self-efficacy is reflected in the human behaviour which contributes in scrutinizing the available options and determining the ultimate career choices. Personal self-efficacy can be derived from four principal sources of information: (i) performance accomplishments, (ii) vicarious experience, (iii) verbal persuasion and (iv) physiological states (Bandura, A. 1977:pp. 191-215).

Self-efficacy beliefs influence motivational and self-regulatory processes in several ways. In other words, they influence the choices people make and the courses of action they pursue. Most people engage in tasks in which they feel competent and confident and avoid those in which they do not (Frank Pajares,1997:1-49). For example, in certain situations students might find that spending of skillful efforts might not be sufficient for bringing the desired outcomes. In such cases, students may possess necessary skills and high self-efficacy required for achieving the desired outcomes, but they may not progress forward because of lack of necessary incentives (Ibid).

According to Bandura, self-efficacy stands for the judgment of one's capability to accomplish a certain task. Furthermore, Bandura also argues that self-beliefs of self-efficacy play a key role in the self-regulation of motivation. Additionally, people who are motivated themselves can guide their own actions based on their own beliefs about what they can do and their own thoughtfulness (Bandura, A.1994:71-81).

A strong sense of academic efficacy can directly enhance the individual's perceptions of self-efficacy regarding future career choices. Additionally, academic aspirations and scholastic achievements also play a mediating role for the enhancement of self-efficacy perceptions. Self-appraisal of the occupational efficacy is important factor for generating willingness to engage in the careers requiring high-level cognitive skills. In this regard, perceptions regarding social and self-regulatory efficacy operate as the supplementary personal resources influencing the dimension of self-appraisal in context to occupational self-efficacy. Therefore, social boldness and efficacy required for curbing transgressiveness are insufficient for ensuring occupational attainments (Bandura A, Barbaranelli C, Caprara GV, Pastorelli C .2001: 191). So from this viewpoint, it can be seen that self-efficacy can be influenced by social context and other factors that allow changing of human behaviour. Such factors can include daily experiences

embedded in some social environment, education, teachers, equipment and training. Additionally, the theory of Pandora opened up opportunities for examining the role of cultural factors in this regard. According to sociological perspective, the cultural factors can be formulated by social context and individual's beliefs and attitudes

"Negative attitude towards Science"

Upon reviewing the important published literature on the subject over the past 20 years, it was found that the presence of different factors within the classroom environment and educational activities that affect students' attitude and interest towards studying science subjects (Jonathan Osborne, Shirley Simon &Sue Collins, 2003). Additionally, these studies have argued that the continuous decline in students' numbers choosing to study science at their point of choice requires scientific examination. Furthermore, this scientific examination should be focussed on examination of various factors that influence the students' attitude towards studying science and related subject. Previous research has found that student attitude towards studying science is affected due to number of reasons including gender, age, curriculum, teachers, cultural and demographics related variables (Ibid).

One of the most common problem faced by the student community is their negative attitude towards science discipline in general. The traces regarding the existence of this negative attitude towards science was identified long back on 1971 when McNarry et al. conducted a study on the secondary school students in United States while examining the factors affecting their choices of education and career. The study grounded the presence of negative attitude within social context of the students (L. R. McNarry, S. O'Farrell ,1971: pp. 1060-1061). Additionally, McNarry et al. (1971) recommended putting additional efforts towards changing the existing attitude of the students by positively enhancing the awareness towards science at the societal level.

The empirical studies conducted in the last few decades reveal that the importance of the internal factors such as personal determinants of the academic achievement and success has also grabbed the attention of scholars. A recent empirical study emphasizes that the students' perceptions about their teachers' goals and peer's goal orientation has a strong influence on their academic achievement and career choices. Dana Vedder-Weiss et al. (2012) stated that school culture also has a significant impact on the students' motivation in addition to teachers and classroom environment. The empirical study conducted on 13,985 students of 15 years of age from 431 schools across Canada examined effects of (i) students' motivations regarding learning science, (ii) beliefs towards science and (iii) instructional practices specific to science on their achievements in science as a discipline (Areepattamannil, S., Freeman, J. G., & Klinger, D. A, 2011). The study

results revealed the existence of only 8% variance regarding science achievements between the schools. On the other hand, 92% of variance was found among the students within the schools. Additionally, the study also revealed that instructional practices involving hands-on sessions, motivational beliefs such as self-efficacy and self-concept aspects such as enjoyment in learning science has substantial positive predictive impact on the science achievement. On the contrary, it was also found that general interest in science has negative predictive effect on science achievement when compared to other contextual variables.

"Status Attainment"

The studies on status attainment suggest that the teenage aspirations are subject to frequent changes. Diverse theoretical and empirical traditions view aspirations as having a trajectory of their own irrespective of theme being considered such as "over ambition", "cooling out", the process of "contest mobility" or the need for "vocational realism" *(Jerry A. Jacobs, David Karen and Katherine McClelland: 610).* This conclusion has also been emphasized by the recent studies which indicate that the differential childhood socialization may be less important than actual experiences at school and work for the formulating student's aspirations and career choices *(Ibid).* In this regard, Osborne et al. (2003) also indicate that the students' attitudes are influenced by deferent factors such as: gender, teachers, curricula, and other socio-cultural variables. Furthermore, the literature also points out the importance of gender and quality of teaching in the formulation of students' attitudes. From the perspective of quality of teaching, we argue that there is a great need of research aimed at investigating and highlighting those aspects of teaching science that makes the discipline of science engaging for the pupils. The available research on human motivations also provides useful pointers regarding the kinds of classroom activities and environment that can enhance the students' interest in studying science (Ibid). Moreover, there are variety of factors that have a great influence on students' decisions regarding career and their attitudes towards science (.E. Myburgh, 2005: 46). For example, family or advice given by their parents, relatives, friends and school teachers. Additionally, the undertaken teaching and learning strategies along with the equipment used during the process also impact the students' attitude *(Eylem YILDIZ, Ercan AKPINAR, Bülent AYDOĞDU1, Ömer ERGİN,2006,2-18).*

The previous studies reveal that for both men and women instrumental attributes have a considerably stronger positive relationship with career decision-making and self-efficacy than other independent variables. Furthermore, there is a significant impact of interaction between internality and instrumentality on career decision-making. However, the existing studies on cross-culture, mixed-cultural populations (Myburgh,

2005) in addition to the ones dealing with Arab population (Abdalla, 1988, 1991; Gaad, 2004) [4] face some deficiencies. They fail to address the results and implications of the interactions between: (i) internality with self-esteem and (ii) instrumentality with self-esteem in context to Arab socio-politics. This effect has been shown to be especially strong in females (McDonald & Jessell, 1992) [5], and even more so for women in Arabic cultures (Abdalla, 1991) [6].

Based on the above theoretical discussions it can be concluded that students' attitudes and self-efficacy are the major factors determining their career choices. Therefore, their attitudes towards science and career choices have a strong influence on their decisions to study certain disciplines and undertake specializations in some areas such as micro ones.

Educational Structure, Economy and Labour Market in Qatar

The secondary education plays a crucial role in the educational system of all societies. The main reason could be its structure as it bridges the gap between the primary and higher education. Furthermore, its importance can also be understood from the perspective of the age-group of the students it caters. It plays a significant role in shaping the human beings during the teenager years which are most tender years of life due to its placement between the childhood and adulthood. Furthermore, secondary school is an important phase for preparing young people for making decisions regarding their future career choices. In this regard, World Bank report (2005) indicated that the investment in the secondary education has highest economic returns not only for the individuals but also for the society. However, it can only have a significant positive impact if it is capable of guiding the students in developing the skills related to analytical and systematic problem solving and thinking.

At present the Qatar society is undergoing economic transition. It is making a transition to knowledge-based economy with the ultimate of goal of building a strong industrial sector by 2030. This is an ambitious vision that would need substantial financial investment and technology. Additionally, it also requires human and social capital coupled with the stimulating cultural context. Qatar has made some progress in this regard but still needs considerable efforts for overcoming these challenges and achieving the desired targets.

Currently Qatar is experiencing financial boom due to the high oil prices and its rapidly growing share in exporting gas. However at the same time, it experiences problems owing to its small population. In order to overcome the problem of small workforce Qatar opened its doors to foreign labor, which resulted in flooding of migrant workers from different countries. As a result of these conditions, the natives of Qatar acquired a minority position in their own country. According to the Labor Survey

Statistics Authority (2011) the Qatari population represents only 6% of the total workforce where majority of the employers work in the government sector (Ibid: Tables: 19, 66). As per Ibid (Ibid: Tables: 19, 66) the Qatari workforce represents about 32% of the total economic force of Qatar where 66% are males and 34% are the females. Furthermore, 60% of the national labor force is employed in clerical occupations while only 19% of them are in education and technical occupations. At the same time, statistics also indicate that 46.7% of women workforce in the government sector is also engaged in the clerical.

The concentration of the national workforce in the public sector and in the clerical positions reflects the outcomes of the educational setup of the past decades. Moreover, from the last 15 years secondary and tertiary education is witnessing decline in the number of students studying mathematics and science (ee: Ziad Said, 2011, figure 1 in the appendix). Considering the aforementioned situational facts, it can be assumed that Qatari society is facing a tough challenge in preparing the generations for achieving the national goals. For example, inefficiency of the mainstream educational setup to adapt the existing curriculum to resolve following problems: (i) the problem of student dropout especially the male counterparts from the secondary and higher education, (ii) motivating the students to innovate, (iii) generating interest among students towards scientific disciplines and (iv) producing professionals meeting the requirements of future labor market. In addition to deficiencies in the educational setup, the parenting styles and various socio-cultural values also complicate the educational process.

The increased efforts are being made for diversifying the education sector. For example, Qatari government is making efforts to initiatives for overcoming the challenges by allocating more resources and investments for the human development projects. Especially, for developing the education system and the research sector for preparing present Qatari citizens and the future generations for meeting the demands of the labor market in terms of the knowledge and skills. In this regard, the educational policy reforms have also been introduced in 2003 under the name "Education for New Era". It has brought about some slight progress in the patterns of student enrolment in different disciplines. However, educational reforms have not been quite successful in bring significant changes in the education in terms of quality. Furthermore, several important initiatives have also been undertaken for encouraging the scientific research in Qatar under Qatar Foundation in the form of provision of Qatar National Fund and the Oases of Science and Technology. In contrast to educational domain, research initiatives have begun to play important role for supporting different sectors such as: industry, health, environment, energy and computing. However, despite

taking all the afore-mentioned initiatives they are still proving to insufficient in bringing considerable changes in the overall picture.

The main problem started when the students began to get motivated towards the disciplines that qualified them for getting sure jobs. Several factors played an active role in formulating students' orientation from the perspective of career choices. The most prominent factor can be their perceptions regarding lack of sense of competence for studying disciplines such as science, mathematics, engineering and technology. Cultural values also played significant role in alienating them from certain professions. Additionally, gender related occupational preferences also performed its role. For example, Qatari culture and their traditions proved to be detrimental for the women's career in general.

In 2004 a survey was run on a sample of 400 Qatari male falling in the age group of 15-19 and 20-24 years (Kaltham Al-Ghanim.2004). The main aim of the study was to investigate the career choices of the young people. On the overall note, the study results reveal negative attitude towards working in the industry sector and getting engaged in professional, technical or handicraft related occupations. At the same time, the findings of the study indicated the Qatari youth's fondness of working in the supervision kind of jobs. Furthermore, the study established a positive correlation between such attitudes of Qatari people with the different socio-cultural factors such as: level of the parent's education, work environment requiring them to wear blue uniforms while working in afore-mentioned professions which contradicted their traditional dress (Thub) and head-dresss (Gatra and Egal).

As mentioned previously, Qatar society also experiences the presence of a strong correlation between the gender and the career choices made by the people. The value system and attitude of the social institutions plays a prominent role in formulating people's preferences towards career choices. It is worth mentioning that they have strong influences on the women's career choices as compared to the male counterpart. In fact, the societal and cultural values are finely embedded in their lifestyle. Qatari society is dominated by patriarchal values, which has determined a list of favored occupation for women. Hence, despite their performance in comparison to men the cultural restrictions start exerting their influence on women right from the stage of making choices regarding their education. In this regard, the study conducted by Kaltham Al-Ghanim (2007) reflects people's opinion that women's abilities are not suitable for certain job types. As there is no specific gender segregation regarding job profiles, family cultural background proves to be the biggest hurdle for women while making their choices of the preferred careers.

Additionally, some of the cultural values strongly inhibit or have barred women's entry into certain disciplines such as engineering. The extent

of their influence can be imagined from the fact that the University of Qatar did not open registration for women at all for few years. Sulaiman et al. (2010) in a study at Qatar University revealed that the recruitment of the women was the major issues rather than their retention regarding entering into the engineering disciplines. The study findings contract the existing notion regarding in ability of women to participate in certain job types as it shows a gap hole at the educational and societal level rather than their lack of abilities for such disciplines. However, the situation began to change slowly as the society and its value system became more open as a result of the economic developments. This was reflected by the increase in the number of women enrollment in the disciplines that were earlier restricted for them. However, still there are certain families in the society who are still stuck with the old value system.

One of the unpublished study conducted by Ras Gas and Dolphin Energy at the Qatar University in 2009 on over 1000 young Qatari people revealed the lack of self-efficacy is the primary factor formulating their orientation towards educational and career choices. It emphasized that the lack of self-efficacy was restricting for studying certain disciplines such as science, mathematics and engineering. In this context, Yousif et al. (2009) found that the aforementioned disciplines led students to make careers in energy and industry sector. Therefore, revealing that the gaps in the educational setup were the leading to the problems in the labor market.

The prevalent socio-cultural factors also impact students' choices of academic disciplines. For example, they showed that the students' have favorable attitude towards literary disciplines while they are in general reluctant towards studying scientific disciplines such as – mathematics, physics and material sciences in addition to specializations like mechanical and chemical industrial engineering. However, the socio-cultural factors exert a stronger influence on women's career choices than men. This becomes evident from the previously mentioned fact that they come into action during the early stages when women's make their educational choices that ultimately define their career choices. At the same time, Labor Force Statistics (Statistics Authority. Labor force statistics 2011) indicate that the females comprise of the majority of the student registrations (77%) for higher education especially at Qatar University. Considering the fact that the majority of the students in the higher education are females couples with the societal perceptions that consider women to be unfit for certain job types creates a challenging situation in the existing labor market. Moreover, the statistics also reveals that only one third of the females are active in the labor market (Statistics Authority. Labor force statistics 2011).

Qatar is experiencing the decline and shortage of the number of students and labor force having STEM knowledge and skills. Such a

situation is pressurizing the existing Qatar economy to make a transition to the knowledge-based economy. Considering the gravity of the prevalent situation Qatar government has set to national vision to transform Qatar's economy to a knowledge-based economy by 2030. For achieving the set goal, the educational system needs enhancement from the perspective of educational methodologies and learning strategies. The new educational system should be capable of attracting or engaging students to study disciplines that will help them in attaining knowledge and skillset required for matching the needs of the changing labor market. Thus, the renewed educational system can contribute towards supporting the national economy.

Research Methodology

Our research methodology has been influenced from a popular believe that innovative and advanced learning environment will increase the learning performance and improve the attitude of secondary school students towards science subjects. Furthermore, it will also impact their career choice ahead in the future. These arguments haven been based (William Carbonaro, 2005:27-49) study which emphasized that innovative learning environment motivates students to put more effort and expand their performance when they face challenges. Furthermore, innovative learning environment inculcates desire to learn and ability to achieve. Due to this reason, our research is aimed at identifying various new learning possibilities offered by the adoption of innovative and advanced learning environment within the secondary schools. Furthermore, advanced learning environment is based on active learning strategy.

Study Planning and Design: This study was organized at the Center of Advanced Martial located in Qatar University during the academic year 2011/2012. The learning Muddle that applied in the experiment based on a set of interconnected information in materials science provided as a research problem to the students. Within the timeframe of two weeks the study participants conducted the research and laboratory experiments for discovering and identifying the critical variables. Additionally, it enabled them to search practical and innovative solutions for making amendments in the material or changing it to other forms under the supervision of senior researchers. The engagement in the laboratory activities enabled students to learn from different perspectives. For example, it empowered them to become self-educated (independent), gave them hands-on experience of working in teams for verifying their findings and presenting their findings in the form of scientific reports.

The conducted experimental setup tested the applicability of a learning strategy that involved indulging in research activities in advanced learning environment (**CAM-QU laboratories**). The tested learning strategy

aimed at enhancing the learning abilities of the students in addition to changing their general attitude towards science. The research based on testing of the learning strategy used following factors as intermediate variables:

Innovative environment (CAM-QU laboratories): This involves transferring a high school student to a non-traditional learning environment. Such a setup will provide students' with the opportunity to think, practice and conduct experiments in advanced scientific labs. Additionally, in the process they will get to interact with the advanced scientific equipment that will provide them exposure to new kinds of research experience.

Active learning strategies such as Problem-solving method: The experiment setup involved the program "I am a Researcher" in which the students are required to solve a given scientific problem. The decision regarding the including the afore-mentioned program was based on the assumption that hands-on experience in resolving research problems can enhance students' motivations to search and investigate the solutions. The educator acted as moderator during this experiment where his/her job was to provide students with some scientific problem, guiding them in using lab equipments followed by observing their progress while ensuring their security at the same time.

Co-operative   learning   method: During   this   part   of   the experimentation the students were asked to work in small groups. Such a setup will enable students to learn working in teams by cooperating with other team members. Apart from developing their sense of teamwork, it will also allow them to understand the benefits of working in teams. For example, learning from the experience of working with others. The teamwork required the students to device solutions and drawing conclusions after they have performed their investigation on the given research problem.

Our research team assumed that if students' participation in an open advanced learning environment under the supervision of a senior researcher would expand their knowledge base. As mentioned previously, during the whole process they will perform various roles, while solving a given research problem such as: active learner, problem solver, self-learner and collaborator while working in teams. The performance of all these activities assumed to bring a positive change in the students' attitude towards science and research. Such a constructive change in the students' attitude will help in developing their sense of self-efficacy and provoking their interest towards studying science in long term. The overall aim of the research experiment is to emphasize the importance of non-traditional teaching methods for enhancing the student learning and improving their knowledge and attitude towards science

The experimentation setup employed the usage of a pre-posttest instrument to avoid any bias in the study results. For example, for ensuring that the experiment results is free from the affects of the additional variable. The pre-posttest instrument was a suitable test design for measuring the learning outcomes of the experiment especially students' learning performance, their attitude towards science and their sense of self-efficacy. The pre-test instrument was tested with the students in school two days before the initiation of the actual educational experiment. On the other hand, post-test instrument was involved after the termination of educational experiment when students returned to their school.

Study Validity Measures: In order to ensure that study experiment produces valid and reliable results, researchers have taken into account several factors that might impact the study results. This includes various factors that might effects the response of individuals when they get tested for-example age, gender, type of school they study (Omar Al Shaibani, 1971, pp. 183-184). Therefore, we collected all kinds of demographics information from the participating students namely age, educational level (secondary in case of all students), grade (all participants were from Grade 12), academic background of the participants (all participants came from same types of schools with similar learning environment) and finally cultural background (all participating students belong to same nationality, community and even speak same language)

Study Participants: In this study experiment a total of 120 high school students comprises of 51 males and 69 females participated. This sample was randomly selected from 1000 students participated from 23 school who participated in Al-Birag learning program called "I' m researcher experiment" during 2011/2012 academic year. These randomly selected 120 students were subjected to an educational experience for over 2 weeks in CAM lap located at Qatar University. The participating 120-student sample was divided into 4 groups where each group was further divided into 6 sub-groups having 5 students in each of the sub-groups

Reliability and Validity Considerations: As reliability and validity of the used scale or parameter of testing participants is important for producing reliable results and generalizing the findings of the study. Therefore, we tested the validity of the second part of the questionnaire survey, which assessed the student's attitudes towards science and their self-efficacy. We used the coefficient of Cronbach's Alpha as a parameter for examining the internal consistency of questionnaire items. The value of the consistency paramter is between 0 and 1 but our questionnaire showed a consistency value of 0.80 which is 80%. This high value of Cronbach's Alpha shows that measures will give same results even if it is applied to a different sample.

Study Results

The study questionnaire consisted of two sections where the first section was focused on accessing the students' ability to gain the knowledge and whether their score meet our expectations. The second part of the questionnaire was based on accessing students' attitude towards research; sense of competence; self-efficacy and their desire to work in groups i.e. team work. The second part of the questionnaire involves five points Likert scale comprises of scales namely strongly agree, agree, neutral, disagree and strongly disagree. The findings of our study have shown that there is a significant improvement of the educational attainment while the student's attitude became positive after the completion of the research. The results are explained below in detail:

Students' learning performance (Knowledge): This assessment is based on the average of correct answers given by the students. We used four point ranking scale namely under score, average score, gained score and excellent score for assessing the results obtained from students. In the testing, we designed as pre-test and post-test so as to examine the differences in the learning performance of the participating students. In order words, pretest and posttest were tools for evaluating acquiring of knowledge by the students. Based on this examination, all the students were divided into four groups and Table 2 shows the students' learning achievement based on gender.

The comparison between the results obtained from the pretest and posttest clearly showed that there has been improvement in the students' knowledge about the science. Additionally the results have also shown that males achieved better results compared to females in terms of gaining scientific knowledge. For-example, mean of the correct answers given by males were 3.22 in contrast to females which was only 2.88 (See Table 1).

[Table 1: Students learning achievement based in gender]

	Gender			Statistic	Std. Error
Pretest	FEMALE	51	Mean	2.57	0.178
			Std. Deviation	1.269	
	MALE	69	Mean	2.70	0.139
			Std. Deviation	1.154	
	Gender	N		Statistic	Std. Error
Posttest	FEMALE	51	Mean	2.82	0.150
			Std. Deviation	1.072	
	MALE	69	Mean	3.22	0.150
			Std. Deviation	1.247	

On comparing the students' learning performance among four different groups, it was found that first and fourth group students achieved the score as per our expectations. Therefore, group 1 and group 4 students

showed remarkable improvement by scoring excellent scores which was 48%. The group 2 score can be evaluated as 27% as excellent while a significant population I.e. 50% of them underscored. Similarly in group 3, about 19% secured as excellent while significant number i.e. 47% scored as "average".

The comparison between the averages of the all four groups was testing through the analysis of variance test (see Table 4). This test has clearly shown that there is a indication for the axes of the three where the values of the significance of the axes in the order are 0.004 and 0.005 and 0.000 which is smaller than the value of the significance test 0.05, so we reject the null hypothesis and accept the alternative hypothesis (ie, there are differences between the averages of students answers according to the group.

Student's attitude towards Science: The questionnaire examining students attitude towards science, self-efficacy and desire to learn have been organized as follows: Group 1: I (Attitude towards science), Group 2: (Self-efficacy) and Group 3: (desire to learn). These three groups are explained as follows: Group 1 examines the students' desire to participate in various science related learning activities, students' participation in the laboratory work, knowledge discovery and attitude towards searching new knowledge. Group 2 examined sense of confidence among students to acquire new research skills and abilities to invest new knowledge and information. Group 3 examines if the student experienced fun while participating in the experiment and do they feel interested while carrying out various activities in the laboratories.

[Table 2: Correlation analysis]

Correlation analysis	Mean	Std. Deviation	N
Attitudes towards science	4.32	0.647	120
Self-efficacy	4.19	0.738	120
Desire to learn	3.65	0.684	120

As we see above there was a noticeable improvement in the 3 axes. Attitudes towards science and Self-efficacy achieved better results.

We noticed from the data that the relationship between the 3 axes direct correlation (positive correlation) and statistically significant is very high (less than or equal to 0.001) and find that the axes (Attitudes towards science) and (Self-efficacy) have a strong positive correlation relationship (.759), but the axes (self-efficacy) and (desire in learning) the correlation was weak (0.481). (See Table 3).

[Table 3: Correlation analysis]

		Participation in the lab	Participation in the program	Desire to participate
Attitudes towards science	Pearson Correlation	1	0.759 **	0.481 **
	Sig. (2-tailed)		0.000	0.000
	N	120	120	120
Self-efficacy	Pearson Correlation	0.759 **	1	0.423
	Sig. (2-tailed)	0.000		0.000
	N	120	120	120
Desire to learn	Pearson Correlation	0.481 **	0.423	1
	Sig. (2-tailed)	0.000	0.000	
	N	120	120	120

**   Correlation is significant at the 0.01 level (2-tailed

Chi-square test of independence: Null hypothesis: the group does not depend on the gender (gender and the group are independent). The alternative hypothesis: Group depends on the gender (no relationship between the group and gender). Chi-square value equal to 3.25 degree of freedom of 3 and less value to the significance level is 0.355. Since the significance level is 0.355 greater than the significance level testing 0.005. Therefore, we accepted the null hypothesis (the group does not depend on the gender).

Student's desire to Learn: The results have clearly shown an improvement in the students' attitudes towards learning. The results based on the differences between pre-test and post-test has shown that percentage of the students' who agreed as "strongly agree" increased from 43% to 52%. Interestingly, percentages of the students settled with "agree" declined from 48% to 37%/. Students those agreed as "neutral" increased from 9% to 11% but still 1% students mentioned, "Strongly disagree"

Students' Self-efficacy: The finding shows an improvement in the students' self-efficacy therefore; students became confident about their research skills. It was found that the percentage of students who agreed as "strongly agree" increased from 22% to 26% and the percentage settled with "agree" increased from 38% to 42%. Interestingly, students who agreed as "neutral" decreased from 27% to 23% and 10% of the students still opted as "disagree" while none answered as "strongly disagree".

Conclusion

As the conclusion of this present study, it was found that advanced learning environment resulted in the improvement of the students' ability to acquire and retain new knowledge. Furthermore, study also concluded that advanced learning environment had direct positive impact on students' attitude towards research and students gained positive attitude towards work as well. After engaging in the advanced learning environment and related

research activities, secondary school students have shown desire to learn and improve their self-efficacy and self-confidence. This shows that regular engagement of students with the advanced learning environment would certainly motivate student towards learning, participating and showing interest about science. In terms of performance of our experiment, study results have clearly shown that this experiment was successful in improving the knowledge of the high school students and their attitudes towards scientific research. Furthermore, experiment was successful in enabling students to acquire new research skills and at the same time increasing the self-efficacy among students. The results showed that the learning based on research activities enhance students' ability for learning.

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TEACHERS' PEDAGOGICAL BELIEF AND ITS REFLECTION ON THE PRACTICE IN TEACHING WRITING IN EFL TERTIARY CONTEXT IN BANGLADESH

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Abstract

Writing is the most focused but the least developed English language skill among the learners in Bangladesh. At tertiary level the situation is not different. Surely, alternative approach(es) different from the current practices in teaching writing is/are the timely need to alter the poor standard in English writing of tertiary level students. Cognition or belief related literature suggests what teachers think and believe has a great impact on classroom practices. So, this study investigates teachers' pedagogical belief in teaching writing assuming it as a vital first step to bring innovations in teaching practices. A mixed-method study was carried out in this regard. 15 teachers from a private university responded to the questionnaire used for this study and two teachers from the same institution were interviewed. The results show a marked discrepancy between teacher belief and practice. Teachers' lack of orientation in different approaches to teaching writing and contextual constraints are, the study finds out, the major causes behind it. Despite the findings need further extensive research to be validated, the results in this study are definite pointers to the dire necessity of teacher education featuring pedagogical orientation on different approaches to teaching writing, techniques of more student engagement in writing process, ways to increase student motivation in writing and procedures of technology integration and using in teaching writing.

Keywords: Teacher belief, Teaching writing, Teacher education

Introduction
Background to the study

As an EFL (English as a Foreign Language) teacher in a private university in Bangladesh, I am always interested in carrying out an extensive

research on teaching writing. My interest stems from the fact that writing is the most emphasized but the least developed skill among the students in my context. From my experience as a tertiary level teacher I have noticed in my context, mostly, in a teacher-centred classroom, developing writing is viewed as achieving grammatical accuracy, developing structural qualities, and gaining knowledge and ability to produce different genres of writing. Students being passive often play the role of information reproducers in a writing classroom. They hardly get opportunity to exercise their creative process of independent thinking and writing within the constraints of a classroom setting. As a result, outside the classroom in a real life, students often falter in showing confidence and capability in producing creative and independent writing. I think approach to teaching writing in my context needs a shift from the teacher-centred to the student-centred to develop autonomy and confidence among learners in writing.

Before any innovation or changes to work properly, it is essential to understand what beliefs the teachers in my context have about teaching writing as teachers are "active, thinking decision-makers who make instructional choices by drawing on complex, practically-oriented, personalised, and context sensitive networks of knowledge thoughts, and beliefs" (Borg, 2003, p. 81). Thus, teachers' thinking systems play a major role in their approaches to, and innovation in, everyday teaching. Therefore, I decided to conduct a study on the interrelation between teachers' belief and practice in teaching writing in my context so that I could recommend suggestions and changes in teaching writing keeping the findings of my study in mind.

The in-depth understanding of Bangladeshi context regarding the use and teaching of English language, with especial focus on writing instruction would definitely substantiate my study on the co-relation between teachers' belief and practice in teaching writing, so the next section throws light on it.

English Language instruction in Bangladesh

The history of Bangladesh and its language are closely entwined with each other. The people of Bangladesh sacrificed their lives in a movement to establish their mother tongue 'Bangla' as their national language in 1952. Ultimately, the movement culminated in the emergence of Bangladesh as an independent nation in 1971. During the pre-independent period, English played a dominant role in every sphere of life in this territory and functioned as the lingua franca. However, with the emergence of Bangladesh as a separate state and the proclamation of Bangla as the sole national language of it, the importance of English diminished and it lost its second language status and turned into a foreign language because of the nationalistic feelings associated with the first language. The visible consequence is poor standard

in English language teaching and subsequent decrease in its roles and functions in the country.

Even, with English being a compulsory subject both in schools and in high schools, the non-use of English outside the classroom seems not to change the poor standard of English in Bangladesh. Hoque (1999) pertinently remarks- "Despite the considerable amount of time devoted to English instruction, the general proficiency and achievement of the majority of the students graduating from high schools is unsatisfactory and disproportionately low" (p.93). Similarly, English Language Teaching Task Force of 1976 set up by the Ministry of Education of Bangladesh (cited from Rahman 1999, p.15) found out that, "The English proficiency of students in class 9 was two years and in class 12 four years behind the level assumed in their textbooks."

In 2001, recognising the importance of communicative competence inside and outside the classroom, English textbooks were redesigned based on Communicative Language Teaching (CLT) approach replacing the earlier Grammar-Translation method (GTM). However, the new curriculum appeared not to bring desired results among students (see Chowdhury & Ha, 2008; Hamid & Baldauf, 2008; Hamid, Sussex, & Khan, 2009). The main reason, as reported in the literature, is the lack of orientation regarding the new methodology among teachers who mostly learned English by means of GTM (Hasan & Akhand, 2009). Besides, I think, the lack of environment outside the classroom to practice English is also a cause.

At the tertiary level, the situation, understandably, is not so dissimilar. Even, in private universities like my study context, with English being the medium of instruction, the proficiency level of English among students is very low. The lack of pedagogical knowledge among teachers on different approaches to teaching English and the lack of English environment outside the classroom are the main reasons behind such poor status in English in Bangladesh.

Present situation of writing instruction in EFL classroom in Bangladesh

As I mentioned earlier, writing is the most emphasized skill in English instruction in Bangladesh because students in different professional and academic exams are required to show their command over English through writing. Still, it is the least developed skill among students. Ahmed (1999) cites a concrete example of it from his study-

> The best student in the class [made] as many as ten errors of article use (wrong article and no article where one is required). You can guess the number of errors made by her class mates who are a long way behind her. These students had read English for about 12 years before they came to university … (p. 168).

Writing in my study context is viewed mainly as developing grammatical and structural accuracy. Students in my context are not provided with the opportunity to develop skills independently or with others in collaboration within the constraints of a classroom to experience and practice the stages to become good writers. Hoque (1999) pertinently remarks-

> . . . both teachers and students of English are mainly concerned about teaching and learning textbook contents, grammar rules, etc. through this traditional grammar-translation method-they are hardly involved in practical and participatory activities for teaching and learning language skills (p. 95) .

As a result, even with linguistic knowledge students often struggle to produce a cohesive piece of writing.

The discussion in this section reflects the poor standard of Bangladeshi students in English language especially in writing skill. So, teachers need to come with apt approaches, methods and techniques in teaching writing to alter the existing situation. And such innovations to work properly it is necessary to understand what teachers think and believe regarding their current practices in a classroom and about changes suggested or implemented. Accordingly, steps can be taken to shape up their thought-process and this study is designed to find so.

Research Question

The research question I have framed for my study is as follows:

"What pedagogical beliefs do teachers have in a private university in Bangladesh that inform their approach to teaching writing in English?"

In other words, I would like to investigate in a Bangladeshi private university context what teachers believe about writing and how far these beliefs shape their practice in the writing classroom. Alternatively saying, I would like to investigate what teachers practice in the writing classroom and to what extent the practice reflects their belief and is based on pedagogy.

Literature review

This section presents the literature review on the two key concepts in my research topic: teachers' belief and teaching writing. These concepts and related studies are reviewed to inform the research methodology and the data analysis procedure I used for my study. The discussion here, will also form a base for the recommendations I am going to make for my research context.

Teacher Belief

The teaching profession can be seen as the juxtaposition of a teacher's individual and social values reflected in teaching and learning in a

particular context. This perspective is quite similar to Borg's (2003) view of teachers as 'active, thinking decision-makers who make instructional choices by drawing on complex, practically-oriented, personalised, and context-sensitive networks of knowledge, thoughts and beliefs' (p.81). In short, teachers' thought process what I have termed in this study as 'teachers belief' plays an important role in any approaches teachers incorporate and any innovation they bring in their everyday teaching.

Definition of 'Teacher Belief'

Borg (2003) conceptualises teacher belief what he terms 'teacher cognition' as teachers' 'knowledge, theories, attitudes, images, assumptions, metaphors, conceptions, perspective about teaching, teachers, learning, students, subject matter, curricula, materials, instructional activities, and self' (p.81). Besides, over past decades there are so many cognate terms for teacher belief that have been utilised by researchers such as 'teacher knowledge' (Freeman, 2002), 'teachers' theories'(Borg, 1999), and teachers' 'personal theories'(James, 2001).

Pajares (1992) reviewed a literature of beliefs and reported that beliefs were defined in most studies as a 'conceptual tool'. He defined belief as an "individual's judgment of the truth or falsity of a proposition, a judgment that can only be inferred from a collective understanding of what human beings say, intend, and do" (p. 316). According to Aguirre and Speer (2000), current definitions of teacher beliefs found in the education literature focus on how teachers think about the nature of teaching and learning. In this context, beliefs are defined as "conceptions" (Thompson, 1992, p. 132), world views, and "mental models" that shape learning and teaching practices (Emest, 1989, p. 250).

Formation of teacher belief and its impact

Borg (2006) suggests a framework (see Figure 2.1) including four elements (Schooling, Professional Coursework, Contextual Factors, and Classroom Practice) that are instrumental in forming teacher belief. It shows that school experiences form the important base behind teachers' ideas about teaching and learning and these ideas have an impact in their professional life. Teachers' concepts about teaching and learning may be tailored and sharpened later by professional development training and through new pedagogical orientations. However, some contextual elements like syllabus and teaching culture may act as the catalyst behind the practices of the teachers which are not reflective of their underlying beliefs. Meanwhile, teachers' classroom experiences influence belief 'unconsciously and/or through conscious reflection' (Borg. 2006, p.283). Other researchers(Meijer, Verloop, & Beijaard 1999) also come up with similar sort of conclusions

that what teachers know, understand and believe is constructed as a result of classroom experience, interaction with students and professional training programs. Research (Andrew, 2003; Cuban, 1993; Freeman, 2002; Golombek, 1998; Pajares, 1992) also suggests that classroom behaviours of the teachers that influence students' learning are governed by teachers' beliefs   about   learning   and   teaching.
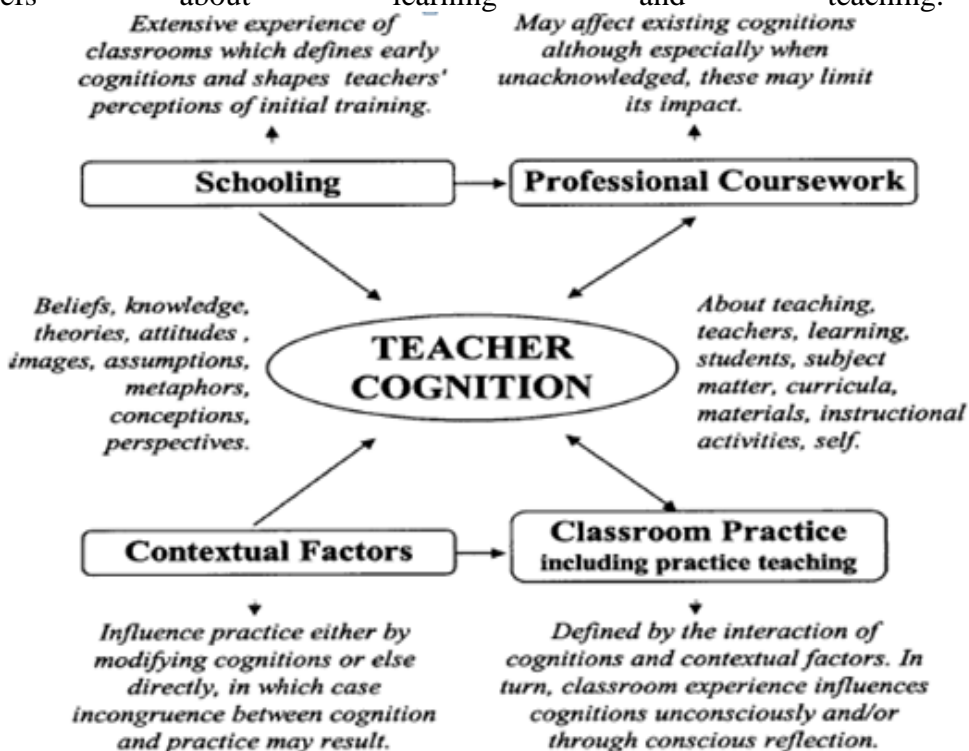
Extensive experience of classrooms which defines early cognitions and shapes teachers' perceptions of initial training.

May affect existing cognitions although especially when unacknowledged, these may limit its impact.

Schooling → **Professional Coursework**

Beliefs, knowledge, theories, attitudes , images, assumptions, metaphors, conceptions, perspectives.

TEACHER COGNITION

About teaching, teachers, learning, students, subject matter, curricula, materials, instructional activities, self.

Contextual Factors → **Classroom Practice including practice teaching**

Influence practice either by modifying cognitions or else directly, in which case incongruence between cognition and practice may result.

Defined by the interaction of cognitions and contextual factors. In turn, classroom experience influences cognitions unconsciously and/or through conscious reflection.

Figure 2.1.2 : Formation of teacher cognition (Borg, 2006, p.283)

The literature reviewed so far brings to light two notable points related to my study.

First, teacher belief is highly influential in shaping classroom practice, so, any process of innovation in teaching and learning for developing writing what I aim to achieve based on this research in my study context should start with an attempt to understand teachers' belief, opinion and views regarding it.

Second, teacher cognition can be shaped and tailored through professional development programs. So, before organising such programs, it is mandatory to understand what beliefs teachers hold regarding any innovation like technology integration. Otherwise, training programs might not be able to feature the areas the teachers need help most to implement any innovation effectively.

Teaching writing

Teaching writing to EFL learners is one of the most challenging tasks for language teachers as it needs high competence in language and 'it takes considerable reflection and experience' to respond to student writing (Ferris, 2007, p.179). In absence of any professional development programs at tertiary level in my study context, teachers are likely to depend on their personal experiences as students, and on the understanding of their classroom situations through observing others or using own intuition to shape their approach to teaching writing. Therefore, it is essential to know what teachers understand and believe about writing instruction as it has an impact on their classroom behaviour and practices.

Teachers' approaches to writing

Writing is the most emphasized skill in my study context. Teachers in writing classrooms play a key role in helping students develop ideas and content, in providing models and different kinds of writings to follow, and in giving feedback through correcting grammatical mistakes and developing structures. All these efforts seem not to work as students in real life often falter in producing a piece of writing independently and creatively. So, relevant literature regarding approaches to teaching writing has been reviewed to understand what approach my participating teachers are following and to suggest what approach suits them best and how.

There are mainly four pedagogical approaches that form the base behind the practice in writing instruction in English: product approaches, process approaches, genre approaches, and process-genre approaches.

In product approach, teachers' focus is on the teaching linguistic features and 'logical construction and arrangement of discourse forms' (Silva, 1990, p.14) in writing. 'Product-based approaches see writing as mainly concerned with knowledge about the structure of language, and writing development as mainly the result of the imitation of input, in the form of texts provided by the teacher'(Badger & White, 2000, p. 154). It seems this is a teacher centric approach concentrating on mainly linguistic and structural features of a language. This is the approach what teachers follow in my study context.

The process approach has non-linear discursive four stages: prewriting/planning; composing/drafting; revising; and editing (Badger & White, 2000). Here the emphasis is on the student and his development as a writer, who like all other writers needs to follow the stages stated here to complete his writing and the role of a teacher is to facilitate the process. So, the approach helps students exercise independence and creativity in writing. However, Badger and white (2000, p. 154) argue that this approach fails to recognise the need of different processes for different types of writing.

The genre approach emphasises that different social contexts require different genres of writing (Badger and White, 2000). So, the writing tasks are to be designed to prepare students to function in such different social contexts.

The process-genre approach is the amalgam of the three approaches while addressing the flaws of each. According to Badger and White (2000), process-genre approach recognises that,

'writing involves knowledge about language (as in product and genre approaches), knowledge of the context in which writing happens and especially the purpose for the writing (as in genre approaches), and skills in using language (as in process approaches) writing development happens by drawing out the learners' potential (as in process approaches) and by providing input to which the learners respond (as in product and genre approaches)' (p. 157-158).

In seeking the most suitable approach to writing, teachers need to understand contextual reality and pedagogical understanding on how to tailor each approach or all to fit into their context. Say, for example, to address the flaws in the product approach used in my study context, the possible alternative could be implementing the process approach to make students autonomous in writing. But the question is how far it is possible to exercise the stages of the process approach within the constraints of classroom setting in my research context, so, this approach needs an extended platform to be implemented, probably, through the process of technology integration. Prior to making all these decisions about the best approach in writing, it is mandatory for the teachers to understand the strength and the weakness of each approach so that they can decide what approach suits their context and how. Professional development programs could be arranged to provide pedagogical understanding to teachers on different approaches to writing. As Sengupta and Ziao (2002) remark such training programs can expand and modify teachers' belief about writing.

Teaching context and writing instruction in English

Researches (Pennington, Brock, Yue, 1996) have shown that practices in English writing classroom are shaped up by contextual influences. They report a gap between beliefs and classroom practices. They identified the following contextual constraints that have caused the gap:

- Students' level of English
- Expectation about teaching and writing
- Teachers' knowledge and perceptions about writing practices
- Time
- Examination and syllabus requirements

Methodology

This section presents a description of the methodological approach I have undertaken for my study.

Research settings and participants

The research was carried out with EFL teachers and the teachers belong to the 'Department of English Language and Literature' of a top-ranked private university located in Chittagong, the port city of Bangladesh. I have been associated with this university and with the department as one of the EFL teachers almost from its very inception and this has influenced me to base my study here.

Participants who are my colleagues and close acquaintances are full time teachers in the department. All 15 colleagues of the department responded to the questionnaire designed for my study. Cluster sampling (Dornyei, 2003) has been followed to select them. My participating teachers, in Cohen et al.'s words (2007, p.104), do not 'represent the wider population' of tertiary teachers in Bangladesh, rather the results of this study are solely the views of a particular group which could be used as a base to carry out further research to make generalizable findings applicable to all the tertiary teachers in Bangladesh.

Besides, my two colleagues, one (H) is an Associate Professor, male and also former Head of the department and the other (F) is a female Assistant Professor, afterwards have been interviewed. The participating teachers (H &F) in this study do not, as Cohen, Manion, and Morrison (2007, p.104) put it, "represent the wider population" of tertiary teachers in the context they are working. However, their range of experience and expertise as teachers brought different dimensions to my research. The male colleague has been in the department from its very inception and playing an integral part in designing departmental curriculum and syllabus. Recently he obtained his 2nd MA in ELT from the University of Essex. The female colleague has been the product of the department she has been working now, so, she has two dimensional experiences: one as a student and another as a teacher.

Adopted research methodology for the study

For the research on teacher cognition, the relevant literatures (Beijaard, van Driel, &Verloop, 1999; Black & Haliwell, 2000; Kagan, 1990; Meijer et al., 1999) suggest a wide range of methodologies and instruments such as journals, questionnaires, interviews, stimulated recalls, classroom observation, short-answer tests, practical arguments and conversation etc. to understand teachers' thought process about teaching and learning. Pertinently, Barcelos (2003) and Borg (2003) remark that a mixture of research approaches on teacher cognition may reveal multi-dimensions of

teachers' thought process towards particular behaviour, actions or concepts what one particular method may unable to produce. So, a mixed- method approach combining quantitative and qualitative (Dornyei, 2003) is useful to 'generate deeper and broader insight, to develop important knowledge claims that respect a wider range of interests and perspectives' (Greene et al.,1997, p.7).

So, I employed a mixed method approach for my teacher belief study regarding teaching writing.

Data collection instrument

As mentioned earlier, the instruments I used for my data collection was a questionnaire inspired from Suwannasom (2010) for quantitative data and interviews for qualitative data.

Brown (2001, p.6) defines questionnaires as "any written instruments that present respondents with a series of questions or statements to which they are to react either by writing out their answers or selecting from among existing answers". A questionnaire involves less "(a) researcher time, (b) researcher effort, and (c) financial resources" (Dornyei, 2003, p.9) to process huge amount of data in comparison to other methods. These advantages prompted me to embark on this instrument.

The method I chose to generate qualitative data for my research is interviewing. Interviewing can take a number of forms but the one I used is termed 'non-standardized interviews online' (Mann et al, 2000, p.75). These types of less structured interviews are conducted with individuals or with groups by email or by chatting using real time software with or without video interface. According to Creswell (2003) and Fontana and Frey (2000), this type of interview is conversational and offers maximum flexibility to ask spontaneous questions depending on individual differences and situational changes. This style of interview suited the purpose of my research as I needed to get access to what is inside a person's mind. Nevertheless, it does not mean that conversational interviews in this study were unfocussed. The purpose of the study was maintained by means of interview prompts (Appendix A).

Moreover, my interview was conducted in Bangla, the native language of the participants. I think my participants were more relaxed in voicing their inner thoughts in Bangla than in English.

Development of the questionnaire

The questionnaire (see Appendix B) was developed based on the literature review on second language writing (Hyland, 2003).

In questionnaire participants were provided a number of statements to select from in accordance with their belief about students' and teachers' behaviour in the writing classrooms.

In A items were designed to understand teacher cognition about students' behaviour in the writing classrooms. The aim was to find out what my participating teachers believed students should develop or be engaged in. I mean whether teachers prefer students developing grammatical accuracy or developing a relationship with others through writing and whether teachers wanted students to be engaged in a collaborative task or in an individual task.

In B I used two categories of verbs in the statements to understand teacher cognition about teachers' behaviour and the role in the writing classrooms. The first category includes the verbs like 'help', 'provide', and 'give' and the second includes 'encourage', 'facilitate' and 'create'. These categories were meant to indicate two contrasting roles of a teacher in a writing classroom: the first category implies teacher as a transmitter of knowledge and the second, teacher as a facilitator. The given tables would exemplify the point further.

First Category		
	Statement	**Interpretation of behaviour**
Teachers	*help* students develop ideas. *provide* models of texts. *give* feedback on accuracy of language.	Teacher centred writing classroom. Teacher as a knowledge transmitter.

Second Category		
	Statement	**Interpretation of behaviour**
Teachers	*encourage* students to write in a local newspaper. *create* a favourable environment for students to write a lot. *facilitate* collaborative tasks.	Student centred writing classroom. Teacher as a facilitator.

Data collection procedures

Before the start of the data collection phase, I sent emails to all my possible participants informing them about my intended research topic with some general ideas related to it along with a consent letter to be signed by them as an acknowledgment to their willingness to participate. After that, I emailed the questionnaires in a word document file to those participants who returned the consent letters with signatures. Though I thought initially of sending an on-line questionnaire, I discarded the idea assuming that participants might feel difficulty in downloading it and responding to it because of the infrequent net connection in my study context. In addition, I

made contact with the participants over phone several times to reinsure their participation, to request to make responses to my questionnaire quickly, and to clarify any difficulties in understanding and in responding any parts of the questionnaire. And interviews I conducted on line with Skype, a computer tool for conversation with video interface, in separate sessions with two participants. Each session lasted around 30 minutes.

In terms of data collection, I made audio recordings of the interviews with the computer software 'Pamela for Skype' and decided not to take notes, in order not to distract from the discussion.

Data analysis procedures

First of all, I organised and prepared the data, collected through the questionnaire and interviews for analysis. The data were then sorted into two types: quantitative data in the form of responses of the participants to different items in the questionnaire and qualitative data in the form of descriptive responses of the interviewed participants.

Throughout the data analysis procedure, as an indispensable part of my study context, I used my own experience and familiarity to interpret the responses from my participating teachers.

Quantitative data analysis

The respondents to my questionnaire were only 15, so I did not use SPSS or any of the computer software to analyse the answers to the questionnaire items. Instead, I counted manually the number of responses in each part and put in a sheet. Afterwards, I analysed them to find out any noticeable pattern in relation to my research questions and in line with the rationale behind designing each item in a questionnaire what I discussed in the preceding section (3.4).

Qualitative Data analysis

Since the qualitative data in my study were interview accounts, they were subjected to content which requires coding and categorising the data. In this regard, Cohen et al. (2007) suggest that content analysis means coding, creating meaningful categories, comparing and making connections between data, and drawing conclusions based on theory from the text.

I started the data analysis by listening to the recorded interviews and transcribing them into the text form. For obtaining a general sense of the data, I read through all the transcriptions, took notes and wrote general thoughts about the data. The data were reviewed and reorganised for the preliminary coding. Then, I clustered related data together and labelled each cluster according to its characteristic. The emerged categories from the interview were then scrutinized to separate the important ones in relation to

my research topic. The segregated categories were afterwards translated in English, though in a paraphrase form.

Throughout the analysis, participants are referred to as F and H to ensure their anonymity. For the sake of continuing the flow of interpretation I have used F and H in brackets so that it is understood which participant provided the data.

The major categories emerged from my qualitative data are as follows:

- Participants' belief about language learning
- Participants' belief about writing
- The interrelationship between teachers' belief and practice in classrooms

I have analysed my interview data using headings like the above ones.

Analysis and interpretation
Quantitative data analysis
Teacher cognition about writing

In the questionnaire participating teachers were asked to select items concerning on what behaviour they expected from students and what role teachers should play in writing classrooms.

Behaviour of the students in the writing classroom

The results of the questionnaire revealed that most of the participating teachers expected students to produce grammatically correct sentence, to be able to write different kinds of writing like reports, letters and essays etc., and to be able to focus structures in the model text. Moreover, majority of the participants in my study preferred students to work individually rather than collaboratively. On the other hand, only a few participants believed students should build relationship through writing and be aware of readers' expectation while writing. It suggests that almost all the teachers in my study hardly thought of writing as a social tool for students to communicate with others. Rather, they were more concerned with students' development of grammatical correctness, structural accuracy, and understanding of different types of discourses.

Teachers' role in writing classroom

Looking at the top five items selected by my participating teachers, it is assumed that teachers in my study context would like to play an active role in writing classes. They preferred to provide students different types of texts as models to follow, help students in generating ideas and content of the writing, decide and provide exercises for students to complete according to the level of their proficiency. In addition, they would also like to give

corrective feedback to students' writing. Overall, it seems writing class is mostly teacher centred in my study context. My assumption gets validated when I see the survey results. It shows that only a few participants preferred teachers playing the role of a facilitator in encouraging students to do a collaborative task, or in creating a favourable environment for students to do a lot of writing and to exchange writing with others. Teachers seem not to favour the idea of students' playing active roles in writing classes or they think that their students need scaffolding from their teachers because of their inferior capability.

However, in the survey it is observed that all the participating teachers would like to encourage their students to write for a student magazine or a local newspaper. It can be interpreted as the reflection of their belief in writing as a social tool. But I would like to disagree with this view as I know from my affiliation with my study context the reason behind their preference to this item in the questionnaire. Once, one of the participating teachers thought of starting a project where students had to send letters to a local newspaper. He felt that if letters got published it would boost up the confidence of the students. The project was a success and afterwards other teachers simply followed the trend. So, teachers' preference to encourage students to write for local newspapers was not influenced by or based on sound pedagogical understanding of learning and teaching a language. If it were a pedagogy driven decision, teachers would have also preferred other activities where writing is regarded as a social tool.

Qualitative Data Analysis
Participants' belief about language learning

Both interviewees believe that language is learned in a natural environment. Referring to her experience F remarks 'students learn a language mostly through listening. As a student when I was admitted to this department I listened to the tutors which helped me a lot to learn. Tutors only played the role of a facilitator. The same principle applies to every student.' Similarly H opines 'students learn a language through communicative activities in a natural environment'.

Participants' belief about writing

My participants believe that 'writing is a process' (H) and 'writers follow several stages to write: gathering idea, planning, revising, drafting etc. and students also need to follow these stages to write.' (F)

The interrelationship between teachers' belief and practice in classrooms

Both the interviewees readily admit that teachers are unable to practice in classrooms what they believe. H remarks pertinently 'our perception and practice stand opposite to each other. We believe in communicative teaching but students prefer rote learning'. He exemplifies his stand referring to his research work. He finds that similar kinds of topics feature in the writing exams by turn. He thinks such tradition encourages rote learning as exams directly control classroom practice. The participants provided the following reasons for the discrepancy between belief and practice in their context.

- Large classroom (H)
- Exam oriented culture (H & F)
- Demands of syllabus completion on time(H & F)
- Low-level students (H)
- Time constraints (H)

When H was asked what changes he made as the Head of the department to reflect his belief, he says 'he introduced some features (brainstorming, planning etc.) of process approach in the writing syllabuses'. However, F does not feel positive about these features. She believes these features students can learn automatically. She reports that she talks most of the time in the writing classroom to make students understand what brainstorming is, how to make plans etc. leaving little space for students to practice writing. She even wishes to change the syllabus to make it more practice based focusing on creative writing.

When F was asked what she does in the classroom, she provides a list of her activities in the classroom. She gives a topic, helps students generate ideas about it, sometimes provides a sample, then lets students write on it, and finally she corrects the students' writing at the sentence and word level. The things she does inside the classroom reflects her belief in the product approach at the application level, though at the theory level she earlier spoke in favour of the process approach to writing.

Both of the interviewees report that the present practices in the writing classroom may not reflect their belief but are helpful in bringing marked improvements among students.

Beliefs about in-class and out of class activities

The stages of the process approach require students to be engaged in out of class activities as the stages could not be followed within the classroom. Since the participants believe in the process approach I asked them how they would value in and out of class activities.

H is sceptical about the effectiveness of out of class activities. He gives prime importance to the classroom because he feels inside the classroom his students will get peer and teacher support what they will not get outside the classroom. When H was reminded of his UK academic experience where out of class activities were more, he pointed out that UK culture could not be replicated in his context because of the difference of academic tradition and academic skill among students.

F, however, supports more engagement of the students in out of class activities even through reduction of number of classes.

Beliefs about technology integration in writing classes

Technology is another avenue through which the process approach to writing could be facilitated. Both the interviewees believe in the affordances of technology but H is doubtful whether technology integration is feasible in his context. He remarks that 'students and teachers sometimes do not get the electricity let alone the internet facility.

F, on the other hand, is interested in technology integration. She reports that through social networking sites students have already improved without formal instructions.

Summary of the findings

Regarding belief about teaching and developing writing, teachers reported that they emphasised students on developing basic writing skills such as the ability to write sentences with grammatical correctness, the ability to focus on structures in a given model, and the ability to understand and practise different genres. Teachers also reported they preferred to play a central role in scaffolding the students to develop these skills in writing classrooms. It implies that these teachers concentrated more on developing students' earlier stages in writing and preparing them instead of letting them prepare and develop with skills necessary in their tertiary context. The idea of developing students as writers with ability to communicate and socialise with others in the authentic real-life world seemed not to be present among teachers.

The findings suggest that my participating teachers need orientation regarding different approaches to teaching writing other than what they follow along with practical demonstration on how each approach functions. The knowledge would help them understand the benefits of empowering students in writing classrooms and make them realise that writing is mainly a skill for social interaction in the real world.

From interview, however, my research study suggests that teachers have sound pedagogical beliefs about writing though they are unable to translate them into practice and reality due to contextual reality and lack of

orientation in different approaches to teaching writing especially at the application level.

Limitations of the study

As mentioned earlier, the respondents of the study was limited, only 15 and the method used for this study was only a questionnaire instead of a mixed-method approach. So, the findings of this study do not have the required authenticity to be generalizable.

In my study through the questionnaire the findings reflect mere opinions of teachers regarding their beliefs in teaching writing. But the study does not reflect what teachers do inside the classroom based on their beliefs. So, further extensive research through classroom observation is required to validate the outcomes of this study.

In the study it seemed a couple of participants were going through the motion and following others in responding the questionnaire. So, these findings need further probe to get validated.

Recommendation
Pedagogical orientation on approaches to teaching writing:

My study manifests inconsistency in writing teachers' espoused belief and teaching practice. For example, participating teachers remarked that they preferred process approach to teaching writing, but there was little evidence in their practice. They either do not know what process approach entails or they fail to come up with ideas to materialize the stages of process approach in their context.

Another alternative interpretation of our findings is that the teachers are merely going through the motion reporting what they think they believe without having deep understanding and convictions on what they. This suggests that substantial professional development is needed to help teachers in understanding different approaches and providing them with the competencies to transform their pedagogical practices. According to Muijs and Reynolds (2002), belief systems alter through practical experience. If teachers do not experience practical demonstration on how each approach to teaching writing shapes in a classroom, they tend to teach the way they have been taught. That's why Calderhead and Robson (1991) and Kagan (1992) warn that mere lecturing on theories and approaches have negligible effect in changing teachers' pedagogical beliefs and practices.

Besides such experiences, Stofflett and Stoddart (1994) claim that teachers need opportunities to contrast these new experiences with their existing teaching and learning activities. They suggest it helps teachers to critically reflect on what they do, what they should do, and what can be done in their context. Eventually, it may become instrumental in restructuring of

their existing beliefs and eventually adopt a new practice that is consistent with their pedagogical beliefs.

Technology use for writing instruction to ensure engagements inside and outside the classroom

A variety of technological tools may be used for EFL writing instruction. For example, Meyer & Rose (2000) suggests a classroom website as a suitable means to generate motivation among students to write for authentic readers which ultimately boost up their confidence and performance in their writing. According to Stout & Murray (2008) class blogs afford "students to collaboratively write blog entries" (p.756). Since these entries are for real audience, I in agreement with Seitzinger (2006) feel that blogs definitely enhance writing skill, promote self-reflection on one's own writing, develop critical thinking and make learners active in learning.

E-mail has been called "the mother of all Internet applications" (Warschauer, Shetzer, and Meloni, 2000, p.3). Since the evolution and revolution of networking world through internet, computers can opportune foreign language (FL) learners with more than drills: "they can be a medium of real communication in the target language, including composing and exchanging messages with other students in the classroom or around the world" (Oxford, 1990, p.79). Besides, writing projects with email, a familiar tool in my study context, provide students opportunity to communicate with native speakers and enable them to have authentic communicative language learning experience (Gonglewski et al., 2001).

Recently, researchers (Cress & Kimmerle, 2008; Guzdial et al., 2001; Yukawa, 2006) suggest using Wiki for creating an interactive, authentic and collaborative writing environment for students. Wiki means a number of interlinked webpages in which users can leave his mark through reading, adding, organising and editing the content (Schwartz et al., 2004). Wikis can be used to facilitate students working in a project with opportunities for collaborative writing. And in such collaboration, creativity is promoted, knowledge is shared and socialisation takes place and all these facilitate learning (Cress & Kimmerle, 2008; Guzdial et al., 2001; Yukawa, 2006)

Reforming assessment system

Lim and Chai (2008) opines, and I agree, assessment system is the 'final frontier' against teachers adopting any innovations in their practice. Teachers are catalyst in furthering students' career and course-end exam results are very important in this regard. Naturally, teachers are keen on engaging students in activities that ensure good grades for them no matter how contrary they are to their beliefs. In my context, de-emphasising learning outcomes in terms of grades may be necessary. If that is not possible

teachers need to come up with ideas to put equal weight on both learning outcomes and final grades in writing class.

Recommendations for future research

My recommendation for further research has several phases.

1st phase: The findings of my present study should be validated by further research with instruments like classroom observation and interviews.

2nd phase: Using the validated findings and recommendations here as principles, professional training program should be organised. Later, a further investigation should be made to understand the impact of training on classroom behaviours.

3rd phase: To make the findings generalizable, the above three phases should be replicated with larger samples in other private and public universities as well.

Conclusion

Now I realise that any innovation I am willing to introduce into my context needs to be tailored according to contextual reality. Based on my study, I feel teachers in my context require more application level understanding of the different approaches to writing to minimise the gap between their belief and practice in the classroom.

I also feel that the beliefs of the teachers in my context need to be extended and enhanced through training programs and these programs should practically demonstrate how different approaches to writing function at the application level, how technology can be brought into the classroom practice keeping socio-cultural setting into consideration and how out of class activities could be linked in a balanced way with in- class activities. Overall, this study can be used as a stepping stone for further research on teachers' belief and its relation to teaching writing.

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Appendix A
(Interview prompts)
Interviewees will be asked about following points:
- Views on language learning
- Why writing important in your context
- Stages of writing/ how you write/ opinions about how students write
- Practices in the writing classes
- Reasons behind their practices
- Responses to their practices
- Thoughts about out of class activities
- Thoughts about technology

Appendix B
Questionnaire
Beliefs about EFL writing Instruction

A. Directions: Please read the following statements about **student behaviours** and put a check (√) to choose
5 items which you think are **the most important features for the Bangladeshi tertiary EFL writing instruction**.

1. Students are able to write grammatically correct sentences.	
2. Students learn how to revise their own drafts as well as to give feedback on the others'.	
3. Students have opportunities to exchange ideas about their writing.	
4. Students are aware of the readers' expectation when they write	
5. Students develop relationship with others through written texts.	
6. Students usually work independently to complete their drafts.	
7. Students usually work collaboratively to complete their drafts.	
8. Students develop different kinds of writing (e.g. letters, reports, and essays).	
9. Students study focused structures in model texts before write their own.	

B.   Directions: Please read the following statements about **teacher behaviours** and put a check (√) to
choose 5 items which you think are **the most important features for the Bangladeshi tertiary EFL writing** i**nstruction**.

10. Teachers help students to develop the content and ideas of the writing.	
11. Teachers encourage students to write for a student magazine or a local newspaper.	
12. Teachers provide writing exercises for students according to their proficiency.	
13. Teachers facilitate group collaborative writing tasks.	
14. Teachers give corrective feedback about the students' language in their drafts.	
15. Teachers provide students different types of texts as models of good writing.	
16. Teachers create a positive environment for students to do a lot of writing	
17. Teachers encourage students to write in response to questions or feedbacks.	
18. Teachers encourage students to exchange their writing with pen pals or key pals.	

MATHEMATICAL MODELING USING SEMANTIC NETWORKS FOR TEACHING

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Abstract
    The purpose of this paper is to show an alternative to teach how people can do mathematical modeling of natural sciences such as physics, biology, earth science, meteorology and engineering disciplines like computer science, artificial intelligence, but also social sciences such as economics, psychology, sociology and political science using semantic networks in order to get a graphical view of the relationships between the components of the problem to be modeled. The main idea is to use the semantic networks to perform the connection between the components involved in the modeling with the concepts, operators and all the possible characteristics of the objects in the processes'events in a fragment of reality for the problem being solved. Mathematical modeling using semantic networks should be apparently more obvious in the sense that the relationship of different components of the system to the model will be more evident. Semantic networks can help better to understand how the modeling of a physical phenomenon of engineering or other knowledge domain, it can be carry out more easily, because the semantic network clearly describes the relationships of objects and concepts of the phenomenon or problem to be modeling.

Keywords: Mathematical Modeling, Semantic Networks, Dynamical Systems.

Introduction
    In this paper We present an alternative to teach how can be modeled some phenomena of areas like natural sciences and social sciences using semantic networks, our purpose is to show how people can teach mathematical modeling using semantic networks to get a graphical view of the relationships between the components of the systems to be modeled.

A mathematical model is a description of a system using mathematical concepts and language. The process of developing a mathematical model is termed mathematical modeling. Mathematical models are used not only in the natural sciences such as physics, biology, earth science, meteorology and engineering disciplines e.g. computer science, artificial intelligence, but also in the social sciences such as economics, psychology, sociology and political science; physicists, engineers, statisticians, operations research analysts and economists use mathematical models most extensively. A model may help to explain a system and to study the effects of different components, and to make predictions about behavior, and simulate the system with it.

In the literature about this theme, we found several documents in treating semantic networks to know how to represent concepts or procedures in mathematics and also to showing paths in a semantic network to select the best way to understand how to solve some mathematical problems in the low level education, mainly to see how people should reasoning and apply some kind of mathematical operation. Mingzhen Li[Mingzhen, 2011]apply path analysis method analyzing the influential factors, on mathematical modeling academic achievement of high school students, toexplores the relationships among the influential factors in mathematical modeling academic achievement, those factors are: mathematical modeling self-monitoring ability, creativity level, the cognitive structure of mathematics and science subjects, mathematical modeling emotion, creative inclination, cognitive style and mathematical modeling belief and they got significant positive correlation with mathematical modeling.

Mathematical modeling refers to modeling learner ability to achieve success which includes carrying on the plan, inspecting, evaluating, providing feedback, making adjustment and controlling the whole mathematical modeling activity. Self-monitoring is the key element of meta-cognition, and its level may significantly influence the possibility and efficiency of success in problem solving [Li, 1997, 2007].

We thought that the semantic networks should be help and give an alternative to understand how those mathematical models can build them up. The advantage of these topics is to understand how the semantic network components such as the physical laws, assumptions, operators, data, and so on, are required to build a model and how those elements are related each other.

Mathematical models can take many forms, including but not limited to dynamical systems, statistical models, differential equations, or game theoretic models. These and other types of models can overlap, with a given model involving a variety of abstract structures. In general, mathematical models may include logical models, as far as logic is taken as a part of

mathematics. In many cases, the quality of a scientific field depends on how well the mathematical models developed on the theoretical side agree with results of repeatable experiments. Lack of agreement between theoretical mathematical models and experimental measurements often leads to important advances as better theories are developed.

Mathematical modeling involves the construction of the model through the creation of real-world scenarios to identify the problem to be modeled making correct assumptions, collecting data and propose a tentative model, test assumptions, refine the model if necessary, adjust the model if appropriate data and analyzing the mathematical structure of the model to the sensitivity of the conclusions appropriate when the assumptions are not exactly found.

To find the mathematical model [Clive, 1980], [Frank, 2003], [kapur, 2005] not only for physical phenomena, but also social sciences or any other, we have to take into account the application of physical laws to specific systems or include unknown parameters that must be evaluated by tests. Sometimes however, the physical laws that govern the behavior of a system are not fully defined and formulate a mathematical model may be impossible. If so, an experimental model of the process can be used. In this process the system is subject to a set of known inputs and the extent of its starts, then the mathematical model is derived from the input and output relationships.

The main idea of this paper is to use semantic networks, in order to get a more illustrative way to introduce to mathematical modeling of physical phenomena or social sciences applications. Also semantic networks may be serves to find a reverse process, i.e. the question ¿how we get a semantic network having a mathematical model in such application area?. This problem is of great interest but it will not be treated here. It is important to talk about the description of physical phenomena or problem in hand using natural language [Bobrow, 1968]. Clearly, semantic networks can help us to understand the modeling of physical phenomenon of engineering or other knowledge domain because it describes the relationships of objects, concepts of the phenomenon or problem in hand involved in the modeling, because people can explain the interrelation of the objects and concepts using Natural Languages to figure it out the semantic network.

Semantic networks ware used by Simons [1973], Shapiro [1971], Rumelhart and Norman[1972] and Schank [1973] have proved to be very serviceable structures for the encoding of knowledge, offering such recognized advantages as a convenient bidirectional linkage between semantically related data and an inherent facility for bundling deep conceptual case systems. However, in their conventional form, networks are rather clumsy constructs for representation of quantification. This clumsiness

is largely a result of the difficulties encountered in specifying the scopes of variables.

Mathematical modeling using semantic networks should be most clear in the sense that it shows us the relationship between of the different components of the system, also the concepts, physical laws and principles involved in the description of the phenomenon or problem to be modeled, because it is feasible to keep track on graphs of the semantic network that it might have better understand.

The paper has been written, initiating with knowledge representation that includes abstraction of what we mean by a fragment of reality, some definitions of semantic networks and mathematical modeling. We gave a couple of examples that generated a system of linear algebraic equations and a differential equation of second order, conclusions and references.

Knowledge Representation

Given a fragment of reality and a physical phenomenon of engineering or other kind of problemto bemodeled, we can propose the following: if P is a set of sentences in natural language [Bobrow, 1977.1979] that describes such phenomenon and if the corresponding set K of well-formed formulas coming from P, as a result of natural language transcription [Bobrow, 1975] [Winograd, 1972, 1975] using an intermediate formal language like calculus of predicate of first order, then, there is a semantic network of P that correspond to the problem in hand.

This proposition leads to a series of consequences for their validity. In the literature there are separate results, such as having a semantic network into predicate calculus for every well-formed formula to describe situations of events that are described in natural language, mainly for representing knowledge in a context and that is one of the schemes knowledge representation in Expert Systems of Artificial Intelligence area, however from the point of view of mathematical modeling we did not find something similar to modeling dynamic systems using semantic networks. We have to mention the research technique from Henry Paynter on graphs link (Bond Graphs) [Paynter, 1961]. Bond Graphs concept was originated in 1961 by Henry Paynter, many investigators subsequently joined to Henry Paynter's idea like Karnoppeg, Rosenberg, Margolis D. L. [Karnopp and Rosenberg, 1968, 1975, 1983, 1990], [Margolis, 1990] Cellier [Cellier, 1991] etc.. The Bond Graphs are a domain-independent graphical description of the dynamic behavior of physical systems. This means that systems of different domains (electrical, mechanical, hydraulic, thermodynamic, acoustic etc.) are described in the same way. The Bond Graphs are based on energy and its interchanges. Professor H. M. Paynter of MIT invented the procedure;

however it is not possible to model other kind of problems with Bond Graphs without energy concept.

The use of mathematical modeling mainly consists in replacing the cognitive object with its mathematical image i.e. its mathematical model, which implemented by logical and numeric algorithms through computers, allows studying the main patterns of the actual process. Such a cognitive method shows the advantages of theoretical and empirical approaches. Working with the mathematical model instead of focusing into the cognitive object, in a fast and cheap manner, permits to analyze and forecast state properties theoretically. At the same time numeric methods allow, using the computer calculation power, through numeric experiments, to verify its behavior and patterns not easily reached by the analytical approach.

Now, if we have to build a mathematical model of some physical phenomenon of engineering within a fragment of reality, we will describe it using natural language and with this description get a set of sentences in natural language which must be grammatically correct. The description of the processes and events using objects, concepts, operators, etc. of that fragment of reality, required to building the mathematical model of the problem in hand, so that, this set of sentences can be transcribedin a set of well-formedformulas using the first order predicate calculus.

In a fragment of reality where there are objects, events, concepts, processes, etc. that occur there and describes the possible data structures thereof, to propose a model of that piece of reality, bringing together all the above in a set of sentences in a formal language, we make the following analysis: Let M be aset of eventsofsome fragmentof reality and$R$ a set ofprocesses of objectsand structuresof$M$that allowan interpretation.Let m be theset of images of$M$, i.e.images thatcan be taken fromeventsthat occur ina logical wayto concludea process, soit should be understoodthat there is alogical formalismof relationsof$M$and$m$.

Let r bea set of processesanddefinitions in$m$than allow a representing ofthe eventsof$M$, so $r$is saidto be arepresentation scheme. It is definedasa body of knowledgeof the structure (M,R) or (m,r). The possibility of interpreting of the elements of r as events$E_1, E_2, ..., E_n$ensures that there is a transformation$f(M,R) \rightarrow (m,r)$, and this representation is completein the sense that there is for each event$E_i$of$M$an image$m_i$of$m$. That is,let m be a set of all possible images of M. In this context we mean an image as a modelof an event$E_i$of$M$. The relationship between the imagesof the elements ensures their existence, thereby obtaining a structure called image's structure. More specifically, if E_i is an event of M and m_i an image of m from E_i, we can think of the structure of image m_i as the relation coordinate between image and reality, and it ensures that m_i is a complete

representation of E_i, this is called a reproductive relation or of reproduction. Reproductive relationship allows the representation of the existing properties of the objects and the relationships between them in the event $E_i$of$M$. Let $f$be the reproduction function that relates an event E_i of M with image $m_i$of$m$. The reproduction allows us represent those properties of the relationships between elements of E_i that are not preserved in m_i but must be represented explicitly.

Let Pbe the set of all feasible natural language sentences in this fragment of reality in which belongs$M$. If the proposition $P_i$of P is an image $m_i$of$E_i$in$M$, then all that a proposition communicates about an event $E_i$of $M$is its reproductive relation, this is because each object carries a name and the relationship between them is an event $E_i$of$M$. It is important to note that a proposition without proper grammatical structure, not represent an image$m_i$ofE_i in$M$. The form of reproductionis necessary foran image$m_i$of$m$ or a proposition$P_i$of$P$isa complete representation ofan event$E_i$of$M$.It can say thatall descriptions ofan event$E_i$thatisin$M$, isobtained from$m$. Thus $P$and$m$ mustbelogically equivalent.That is,we want tohavethe possibility of referringto $r$eitherthroughpropositions of$P$or throughimages$m$ or both.Thus we haveobtainedanevent $E_i$of Mthat can be describedthrough a proposition$P_i$from$P$.

The engineeringphysical phenomenain the reality fragment can be described by means of elementsof P.Let Kbe the set ofwell-formed formulas ofelements of Pwhichdescribes theengineeringphysical system. Since eachelementof Khas an associatedsemantic network,thenthe combinationof themgives usthe semantic networkofthe entire physical system.

Withthe idea of elucidatebetter theengineeringsystems modeling, we give some simples concepts onsemantic networksand their relation tothe formal languagepredicate calculusof first order.

Semantic Networks

Semantic networks were treated in Aristotelian philosophical era by the Greek philospher Porphyry in his commentary on Aristotle's categories as a way to illustrate the methods of Aristotle to define categories.

Basically, it can distinguish six types of semantic networks [John F. Sowa,2008] and those types can see in the Encyclopedia of Artificial Intelligence, edited by Stuart C. Shapiro, [Shapiro , 1987].

A semantic network or net is a graph structure for representing knowledge in patterns of interconnected nodes and arcs. Computer implementations of semantic networks were first developed for artificial intelligence and machine translation, but earlier versions have long been used in philosophy, psychology, and linguistics. The Giant Global Graph of

the Semantic Web is a large semantic network find in Berners-Lee et al. [Berners-Lee, 2008]; and Hendlerand van Harmelen in [Hendler, 2008].

What is common to all semantic networks is a declarative graphic representation that can be used to represent knowledge and support automated systems for reasoning about the knowledge. Some versions are highly informal, but others are formally defined systems of logic.

The first formalized knowledge representation were given by Quillian, R. [Quillian, 1968], Raphael, B. [Raphael, 1968] and Shapiro andWoddmansee [Shapiro, 1971]. The semantic network schemes have a very solid psychological foundation.

In the literature of this subject, there are several documents that treat the theme mainly related with the knowledge and basically with the social sciences like psychology for example, some networks were explicitly designed to implement hypotheses about human cognitive mechanisms, while others have been designed primarily for computer efficiency. Sometimes, computational issues may lead to the same conclusions as psychological evidence. The distinction between definition and affirmation networks, for example, has a close parallel to Tulving'sdistinction between semantic memory and episodic memory[Tulving, 1972].

Network notations and linear notations are capable of expressing equivalent information. But certain kinds of information are easier to express or process in one way or the other. Since the boundary lines are vague, it is impossible to state necessary and sufficient conditions that include all semantic networks while excluding other systems that are not usually called semantic networks.

The most common networks known in several papers on artificial intelligence, philosophical, psychological and linguistic area, are:

Networks, IS-A: In which the links between nodes are labeled. Conceptual graphs: In which there are two types of nodes, concepts and relationships.

Frames: In which the junction points of the links are part of the node's label.

In general, when we speak about semantic networks [Shastri, 1988] we often referred to one of these schemes, typically IS-A networks or frame-based schemes, which share certain fundamental characteristics, ofthese shared characteristics include default inheritance.

The frame-based schemes allow great flexibilityand they have received the most attention from researchers in cognitive science and linguistics [Simmons, 1973]. Definitely the kind of semantic networks are IS-A quintessential.

In fact a semantic network is used when one has knowledge that is best understood as a set of concepts that are related to one another.Most

semantic networks are cognitively based. They are intractable for large domains. Finally they don't represent performance or meta-knowledge very well.Some properties are not easily expressed using a semantic network, e.g., negation, disjunction, and general non-taxonomic knowledge. Expressing these relationships requires workarounds, such as having complementary predicates and using specialized procedures to check for them, but this can be regarded as less elegant.

The networks IS-A are the results of the observation that much of human knowledge is based on the assignment of a subset of items as part of a more general one. The natural classical taxonomies are a good example: Mass-Spring (MS) is a Dynamical System (DS), A Dynamical System is a combination of components (Comb_Compts), A combination of components is a physical system. We can express those sentences in a symbolic form using calculusof predicate of first order, to get a set of well-formed formulas (wff); those wffshave an implicitly semantic network.

$(\forall x)(MS(x) \rightarrow DS(x))$

$(\forall x)(DS(x) \rightarrow Comb\_Compts(x))$

$(\forall x)(Comb\_Compts(x) \rightarrow Physical\_System(x))$

The conceptual graphs, proposed byJohnSowa[Sowa 1984] differ from IS-A networks inthat the arcsare not labeled,and the nodesare of two types: conceptnodes, which can represent bothan entityas a stateor process and relationnodes, which indicate how they relate totheconceptnodes. Therefore there arerelatednodesthat makethe role oflinksbetween entities.

There are two conceptual graphs notations, the linear form, and the unfolded form or diagrams, the notation types of elements are given by: The conceptual nodes drawing by rectangles, the relationship nodes drawing by circles, the arrows that give the flow of direction to the nodes, and the operation nodes drawing by circles within them an operator. For example,figures 1and 2.

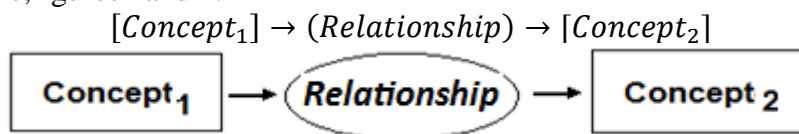$$[Concept_1] \rightarrow (Relationship) \rightarrow [Concept_2]$$

Figure 1. Notations of conceptual graphs

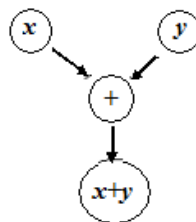$$[Quantity_1] \rightarrow (Operator) \rightarrow [Quantity_2]$$

Figure 2. Notations ofoperational graphs

In this way wecan be generatedgraphs that represent conceptsquite complex. As an example, we present one for thedynamical systemmass-spring.
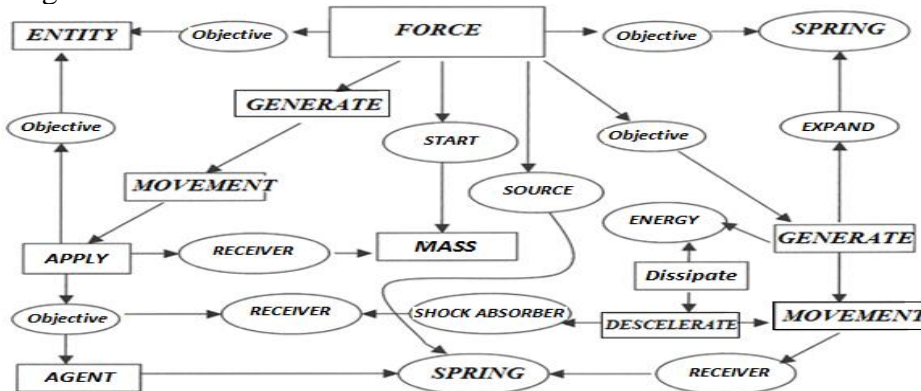

Figure 3ConceptualGraph for the dynamical system ForceMass-Spring.

In the semantic network of figure 3, the mass, which is the receptor for applying spring force and the agent, is the recipient of movement. The Force is an entity whose goal is to apply motion. The spring is the instrument of force, which generates movement to expanding, the energy generated by this fact is dissipated due to the shock absorber and decelerate the movement. The source of force is the spring that is the agent of application´s force and the shock absorber as the receiver.

In a semantic network, the information is expressed by a set of nodes connected to each other by a set of labeled arcs, showing the relationships between them. One sentence in natural language is a symbolic representation in predicate calculus of the first order and in turn has a graph description. From the formal point of view, the terms, symbolic constants and variables and functional expressions are represented by the nodes of the graph and predicates by arches, the tail of the arc leaving the node represents the first argument of the predicate and the head of the arc entering to the node represents the second argument, for example the sentence "All springshave potential energy", in the predicate calculus of first order is represented as:

$$has(SPRING, POTENCIAL\_ENERGY)$$

orlike:

$$(\forall x)(SPRING(x) \rightarrow POTENCIAL\_ENERGY(x))$$

Where the argumentsin this case aresymbolic constants, representedin upper case, itsassociated graphof this example is:
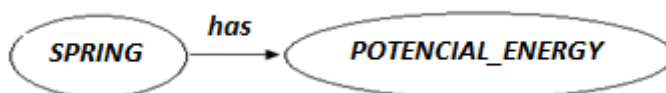
The nodesand arcsof thesegraphs arelabeled bythe termsof the predicatethat theydenote.

The semantic network sare useful to descry bepurposes that are givenin astructural graph ofset of facts. The networknodesare labeled bysymbolic constants,alsoit can be labeledwith variablesthatwill bealphabet's lowercase, for example,x, y, z ...the variables arestandardizedandare assumedseparatelyuniversallyquantified.The scope ofsuch quantificationis the set offactsonthe entire semantic network.

In order to represent graphically therelationships ofpossible componentsof a dynamic system or other kind of problem that we want to model knowing that a system is a combination of components that work together to achieve a specific objective, we will seehow to obtainthe semantic networkassociated with it.

Not limited to physical systems, the concept of a system can be extended to abstract dynamic phenomena, such as those found in economic, transportation, population growth, biological, etc.

Any attempt to design a system should start with a prediction of execution before the system itself can be designed in detail or actually built. This prediction is based on the mathematical description of the dynamic characteristics of the system. This mathematical description is called a mathematical model. For most physical systems mathematical models are described in terms of differential equations.

The purpose of presenting the modeling of the system using a semantic network is to make more explicit the relationship of each component and how the concepts are involved and its content for people that want to teach how builds a mathematical modeling. The central idea is to establish a way to elucidate the mathematical model and interpret the interactions of dynamic system components, primarily identifying the inputs and outputs thereof.

Mathematical Modeling

Mathematical modeling involves the construction of the model through the creation of real-world scenarios to identify the problem to be modeled making correct assumptions, collecting data and propose a tentative model, test assumptions, refine the model if necessary, adjust the model if appropriate data and analyzing the mathematical structure of the model to the sensitivity of the conclusions appropriate when the assumptions are not exactly found. We illustrate the modeling process in the following figure4.
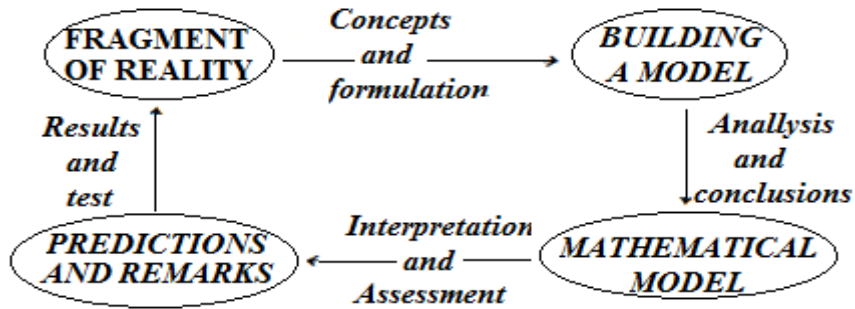
Figure 4. The usual process to get a mathematical model

Example: We would find the mathematical model, of the following problem:

"Betty and Laurita have some stamps, between the two are eighty, three times Betty´s has five more than twice of Laurita has".
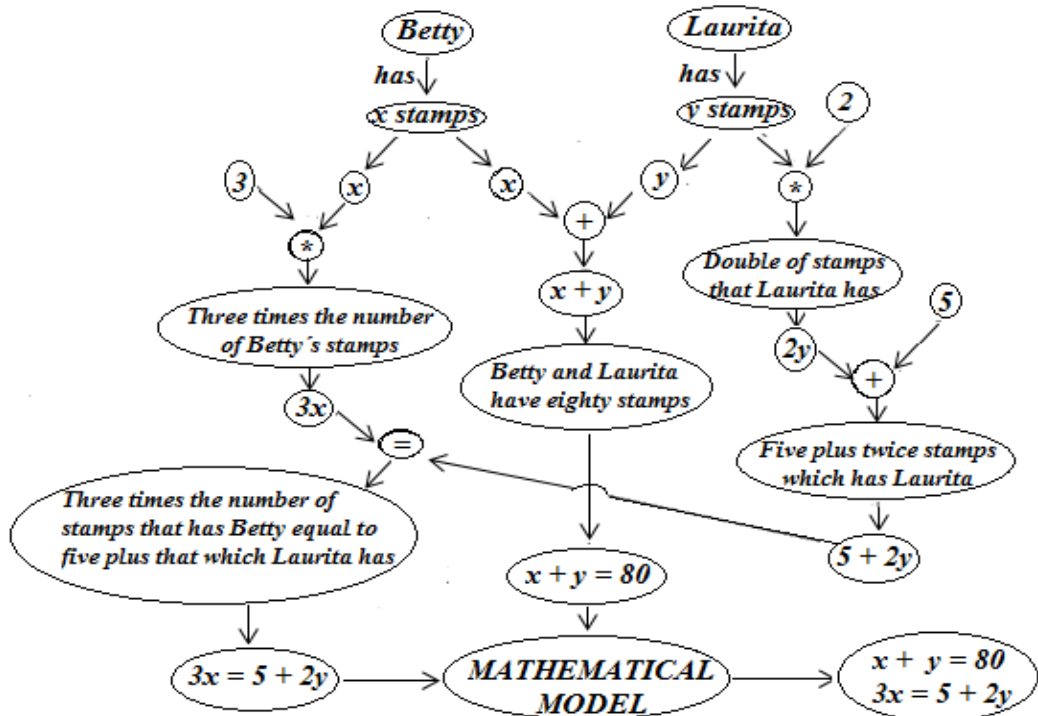

Figure 5 Semantic network of the above example gives us a linearsystem ofequations.

Taking each sentence of the text of the above problem we can obtain a set of well-formed formulas and build up the semantic network as we show in figure 5.

The next proposition gives a description of a dynamical systemthrough the semantic network.

Proposition 1. Let S be a dynamical system taken from a fragment of reality M and $R$the set of events that occur in S, let P be the set of sentences in natural language that describes each of the events of S belong to R and their relationships, and let K be the set of well-formed formulas obtained from each element of the set P. Then there exists a semantic network induced by P that describes the dynamical system$S$.

As an example of the above proposition, let's take the dynamical system mass-spring as the system S, then all the components and its relationships, we can describe them using natural language and build the set P that contains all the sentences that describe S, therefore exist a set K of well-formed formulas (wff).

If S is a dynamic system, and P a set of natural language sentences describing$S$, then exist a set of well-formed formulas obtained from P, since every well-formed formula has associated a semantic network, and because the wffs are constituted of atomic formulas, then the network´s nodes also are atomic, i.e. when they correspond to these atoms not change and if there is a set of well-formed formulas, then there exist a semantic network to be constituted of all networks generated for each wff. Therefore we can say that the proposition 1 gives the feasibility that carry out this formulation to get a mathematical model.

To illustrate themass-spring dynamic systemmodeling, we start withthe diagramof Figure 6, which consists of a mass$m$, damperandspring, is a system withone degree of freedom, and it is an examplein whichthe oscillationscan be describedwithjust one coordinateq(t).
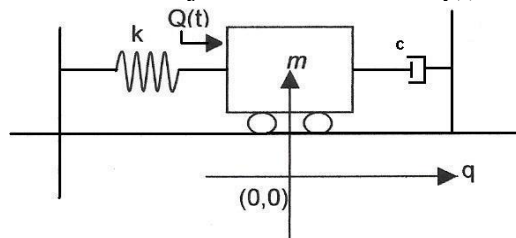

Figure 6.The dynamicmass-springsystemwithdamping.

To illustrate those facts consider the following sentences obtained from Figure 6. They are facts and propositions that elucidated the mass-spring system.

"If the mass moves, the $q(t)$ is increased, then the spring exerts a force$f_s$on the mass such as the force is equal to - kq(t)". Which can be written in terms of predicates like:

$$moves(MASA, INCREASE - q(t))$$
$$exercises(FORCE - f_s,\ MASS)$$

And graphing as

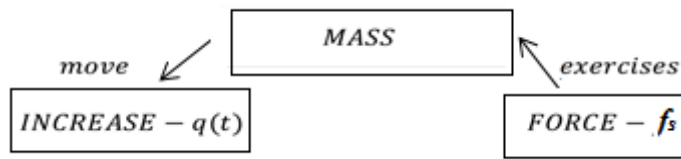Figure 7.The Semantics Network generated by the natural language sentences.

Now using semantic networks we can elucidate the mathematical model, with a better view on the relationship of system components, as shown in Figure 8. That maybe we described using natural language as follow.

The system consists of a mass m which can it slide along a horizontal plain. The mass acts on a spring of constant k, a damper with coefficient c and an external force $Q(t)$. The position of the mass at any time during its movement it is specified by the coordinate q(t) measured from its mass's equilibrium position. The force$Q(t)$ it's acting in one directiontending toincrease$q(t)$. When the massmoves a distance$q(t)$from itsequilibrium, the spring exerts a force $f_s = -kq(t)$ and also the damper exerts a force $f_d = -c\frac{dq(t)}{dt}$ on the mass$m$. Applying Newton's second law of motion, we equate the forces acting on the mass, for its acceleration, obtaining: $Net force = f_s + f_d + ma$,   then, $m\frac{d^2q(t)}{dt^2} = Q(t) - kq(t) - c\frac{dq(t)}{dt}$therefore   motion's equation is given by:$m\frac{d^2q(t)}{dt^2} + c\frac{dq(t)}{dt} + kq(t) = Q(t)$ or using dot operator $\bullet = \frac{d}{dt}$ looks like this $m\ddot{q} + c\dot{q} + kq = Q(t)$which is the mathematical model of the physical phenomenon described, as we show in figure 8 involving all those elements that we were talking about of the semantic networks, maybe you aware that we didn´t give set P of sentences and the set K for the well-formed formulas (wffs).
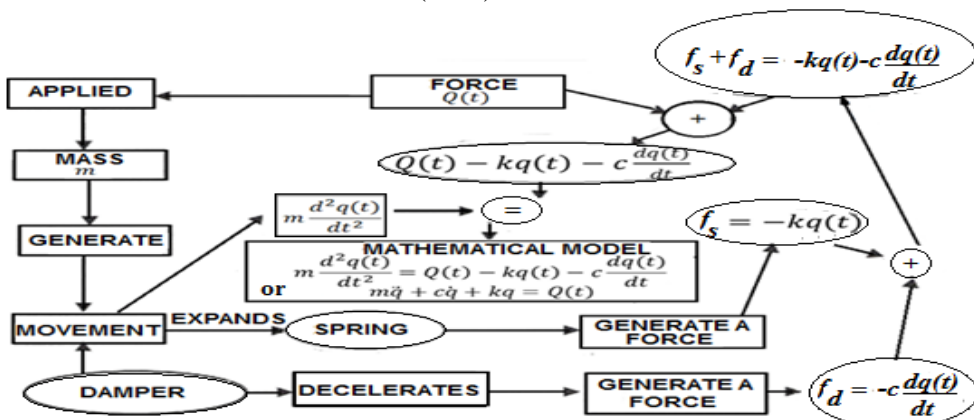

Figure 8. The semantic network for the dynamical system mass-spring to getting the mathematical model for it

Conclusion

Any attempt of teaching mathematics has an incentive mainly knowing that all the effort served for any person can improved their learning in mathematical modeling and to find alternatives for this purpose. Mathematical modeling is one of the most salient issues on applied mathematics because of the need to test and verify the results of experiments through simulation using the mathematical model and especially for those experiments that are too expensive or maybe not feasible to repeat, due to the impossibility in its magnitude in the physical phenomenon or both, as in the various parameters involved on it, for example the events that usually occur in a nuclear power plant. We should mention that it was interesting tracking the sequence of steps to build the mathematical model, following trail in the fragment of reality that can it help to understand how to build the mathematical model using semantic networks. Finally we can say that using semantic networks to teach mathematics it will be more comprehensible the process to build the mathematical model especially for those who are beginners in this area.

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EFFECTIVE FACTORS ON THE ACCEPTANCE OF ELECTRONIC IN-SERVICE TRAINING BY HIGH SCHOOL TEACHERS; FORMULATING SOME ACTION PLANS TO DEVELOP E-TRAINING
CASE STUDY: BANDAR ABBAS HIGH SCHOOL TEACHERS

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Abstract

The development of information technologies and the impact of the telecommunication devises on the societies has changed and evolved the training methods as well. These changes are being occurred so that every person can do learning anywhere anytime through any device he/ she prefers. The development of the technology and its cheap costs has made the man to approach newer tools for transferring the knowledge in societies. This research aims to study the synergies of electronic training technologies in in-service programs for high school teachers. In this regard, this study attempts to explain the effective social, cultural, technical, technological and economic factors on the acceptance of such trainings, and to offer some action plans for promoting this type of trainings in high schools. To fulfill this objective, a questionnaire was formulated and distributed between the high school teachers in Iranian Bandar Abbas City to discover the most effective factors. After the reliability and validity of the questionnaire were confirmed, the collected data were analyzed using SPSS software. Obtained results show that the effectiveness of socio-cultural, technical-technological, and legal factors is confirmed but the economic factors don't show any effect on the acceptance of electronic in-service trainings by high school teachers.

Keywords: Acceptance, Effective Factors, Electronic Training In-service Training,

Introduction

Nowadays, the application of the information and communication technologies is inevitable. Indeed, these technologies can solve many problems of traditional trainings of teachers including the needed time for attending in the school and interruptions in the school programs, lack of synchronization between the changes in the textbooks and the pace of education, locational and time limitations, etc. The mentioned type of trainings can provide modern methods for training the teachers.

Moreover, as a fundamental element in all educational programs, the teachers play a vital role in facilitating the learning and the effectiveness of the process of education. The increasing development of sciences and the necessity to change the educational system in our time makes the need for updated teachers a real concern of the educational system. Since the traditional approaches are no longer able to meet all educational needs of the teachers, the application of electronic trainings seems necessary and inevitable.

On the other hand, the importance of professional trainings of the teachers, especially the teachers of high schools seems undeniable because the high school is one of the most important grades of education with regard to its effect on the educational success of the students and its effect on the students' future pass and on the courses of studied they will approach in the universities. Accordingly, this research aims to study and analyze the effect of social, cultural, technical, technological and economic factors on the application of electronic in-service trainings of the teachers. Besides the identification of effective factors, this research emphasize on the level of this trainings in high schools.

Problem statement

With the development of electronic communications, distance learning has found new position and it has changed to be an educational solution for training the busy and employed individuals and those who cannot attend the schools and university to learn. The development and application of communicational technologies in educational systems is indeed a way of changing the educational process and it can facilitate the process of providing and receiving educational courses in different places (Murphy and Terry, 1998, quoted by Zamani and Moqaddasi). In discussing the role of ICT in the in-service teachers' training we have to remind that ICT by definition is to collect, organize, save and publish the data including audio, video, textual, or digital data using computer and telecommunication devices.[4] Thus a suitable application of information and communication

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[4] Available at: http://ict.moe.org.ir/usrFiles/UsrImages/ICT.jpg

technology is its application in the teachers' in-service trainings. According to Garrison and Anderson, e-learning has inevitably changed all methods of learning and teaching in 21st century and it will continue to be a vital vein of technology-based learning. Some of the most important capabilities of modern information and communication technologies in the teachers' in-service trainings are as follow:

a. Increased access to trainings and educational sources and materials;
b. Flexibility in teaching;
c. Deepened and durable trainings and improvement of the learning quality;
d. Reduced costs; the ICT-based trainings mainly have high fixed and low variable costs totally lead saving the money in large scales;
e. Providing organized opportunity for relearning along with acquiring new knowledge and skills;
f. Simultaneous training
g. Professional training of the teachers in a participatory method. The application of ICT can be put forward in different points of the country and to create "virtual learning groups of teachers" so that the teachers can share their experiences, plans, materials, booklet files, and participatory projects to other teachers.

The acceptance of technology and electronic trainings as a system is shown in the Technology Acceptance Model (TAM) (Figure 1)

Considering the advantages of electronic trainings and increasing application of these trainings in developed and developing countries, now the problem of the research can be formulated as follow: what is the effect of social, cultural, technical, technological and economic systems on the training components in general and on the teachers' in-service trainings in particular; and what strategies can be suggested for developing these technologies?
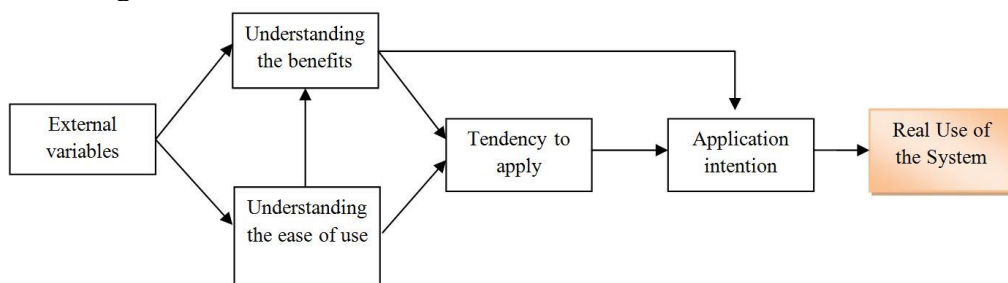

Figure 1. Technology Acceptance Model (TAM)

Effecive factors in electronic in-service training systems

In the conceptual model of the technology adoption (Figure 2) we see that different cultural, attitudinal, technical, managerial and pedagogical factors are involved. Moreover, facilitating conditions and providing

different (technical, educational, legal, etc.) facilities are directly effective on the technology adoption as well. These factors in turn lead to attitude toward the technology use, educational compatibility, computers self-efficiency, and perceived usefulness; and all these factors finally lead to the technology adoption.
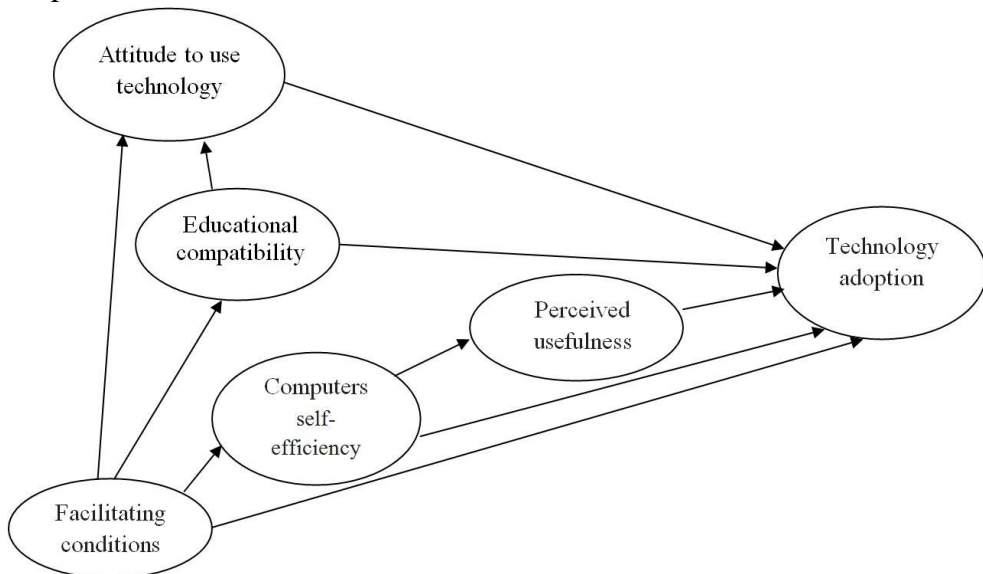

Figure 2. Prediction of technology application in learning (Chan, 2012)

Literature review

The original idea of using computers and computer networks for the scientific and educational applications roots in 1960s when the main objective of so-called APIIA project was to create a network for exchanging military data. But since 3 centers out of the 4 centers of the project were based in American universities, the APIIANET (which finally led to global internet network) was grown in an academic setting. The development of internet technology at the beginning of 1990s, electronic trainings grew rapidly to fix their position in the educational system of many countries of the world.

Iranian Ministry of Education implemented the "Iranian Comprehensive Informatics System" since 2000s. This system covers 4 dimensions: human resources, educational institute, courses, and students. The current Iranian electronic in-service training situation shows that more than 30% of the teachers' in-service trainings are administered on the electronic setting (Garmaroudi, 2012).

According to the available literature, most fundamental challenges of the electronic training in Iran include the socio-cultural barriers, electronic (software and hardware) barriers, legal barriers, pedagogical barriers

(including cognitive, content, and educational barriers), and economic barriers (Razzaqi, 2008). The most relevant resources of the literature to our current studies are as follow:

- Chun Lai (2012) believes that there is a direct positive relationship between the perceived usefulness or uselessness of technology in learning, attitude to technology, facilitating conditions, application efficiency, and educational compatibility (skills of technology application) so that the educational compatibility is directly and positively related to the technology application. Moreover, the attitude to the technology has a strong effect on technology acceptance and technology-based learning. The other factor is ICT skills which are very effective on using the technology. Besides, Lai found that the students who have used technology in their bachelor learnings are more opt to accept the technology in other trainings.

- Hosseini (2007) found that the discovered barriers in the e-learning underdevelopment of Iranian educational system are significant. Socio-cultural barriers have the highest effectiveness on the underdevelopment of e-training in Iran. The economic barriers stand at the second rank with regard to their effect on the underdevelopment of e-trainings. Then the legal barriers, pedagogical barriers (including cognitive, content, and educational barriers), strategic barriers, and technical and technological (including software and hardware) barriers stand on the next rank respectively with regard to their effect on the underdevelopment of electronic training in Iran.

- Nasiri (2011) found that there is a significant relationship between the electronic training and self-efficiency. Moreover she observed a significant relationship between electronic training and the effectiveness of such trainings on a 95% confidence level. On the other hand, with regard to the demographical components (including the age, work experience and education) there is no difference between the electronic trainings and the studied factors. Additionally, there is no significance relationship between the age and education on one hand and the empowerment on the other hand, but the relationship between the empowerment and the work experience was found to be significant.

- Salehi (2011) found that the computer facilities and equipment are suitable for administrative affairs in Iranian schools; but these facilities and equipment are not desirable for educational affairs (i.e. students and teachers' use). Moreover, the ICT skills of teachers are not desirable but they have strong motivations for benefiting from the modern technologies.

Reviewing the scientific literature of the subject shows that it seems the following factors have been effective on the acceptance of electronic in-

service trainings by the teachers: (1) socio-cultural factors; (2) economic factors; (3) technical and technological (software and hardware) factors; (4) pedagogical or educational (cognitive, content, and planning) factors; (5) legal factors; (6) strategic factors.

Overview
Objective of the research
The main objective of the research has been to study the synergies of electronic training technologies in in-service programs for high school teachers, focusing on the effective social, cultural, technical, technological and economic factors on the acceptance of such trainings, and to offer some action plans for promoting this type of trainings in high schools in general, and high schools of Iranian Bandar Abbas City in particular.

Questions of the research
- What are the most effective factors on the acceptance of electronic in-service trainings by the teachers?
- How the social, cultural, economic, technical and technological, and legal factors affect the acceptance of electronic in-service trainings by the teachers?

Hypotheses of the research
- There is a direct relationship between the socio-cultural conditions (age, gender, and education level, field of study, ethnicity, and geographical area) and the acceptance of electronic in-service trainings by the teachers.
- There is a relationship between the economic factors and the acceptance of electronic in-service trainings by the teachers.
- There is a direct relationship between the technical and technological (hardware and software) factors on one hand and the acceptance of electronic in-service trainings by the teachers on the other hand.
- There is a relationship between the legal factors and the acceptance of electronic in-service trainings by the teachers.

Methodology, statistical population and sample
This study is a descriptive-applied research which is applied one with regard to its objective. The nature of this research is descriptive-analytic with regard to its method of data collection, emphasizing on the correlation analysis method. The statistical population of the research includes all high school teachers of Iranian Bandar Abbas City who were teaching in 2012-13

among which 100 teachers were selected as the sample of research using Morgan's Table Editor and a stratified random relative sampling method.

Data collection and data analysis method.

To collect the data we used a researcher-made questionnaire and the inferential and descriptive analyses were applied on the obtained results using Pearson's correlation test, variance analysis and independent T test in SPSS software. In order to cover the questions of the research we used frequency, percentage, mean and chart, unidirectional t-tests and the exploratory factor analysis.

Effective factors on the acceptance of electronic in-service trainings by the teacher

In all in-service trainings we should keep in mind virtually that the cultural context is the most fundamental support of barrier of any changes in the societies; and the socio-cultural characteristics are a good setting for introducing new technologies into the societies. Besides emphasizing on the fundamental role of cultural context in supporting the application of new technologies in training the human resources, other factors that have to be considered are as follow: common viewpoint of the members of a group, accessibility to the technologies, professional qualification of the trainers, technical cooperation, attitude to the training, and evaluating the supportive policies (Shams, 2005).

Socio-cultural factors

Among the most important socio-cultural factors that are effective on the acceptance of electronic in-service trainings we can refer to the age, gender, education level, field of study, ethnicity, and geographical area.

a) *Age*: being interested in new learning and teaching methods require spending more energy, seeking diversity, and being open to new experiences. It is expected that the rise of the age increase the resistance of individuals against the acceptance electronic in-service trainings.

b) *Gender*: in his book titled *Individual differences*, Hamzeh Ganji refers to the existing differences between their genders and the effect of these differences on learning and teaching. According to him, the different visual and auditory perception, skills and senses of the two genders show a significant difference. These differences will distinguish the two genders in their learning methods and consequently in their acceptance of electronic trainings.

c) *Marital status*: since the married persons are usually busier and their time for learning is more limited than the single persons, it is expected that the acceptance of electronic in-service trainings is different by the

married and single teachers. Moreover, since the single persons have more free time to work with computers, this point has to be considered and reflected in the results of the research.

d) *Education level*: since the higher education is the business of dealing with different methods of learning, it is expected that the teachers with university education are more interested in electronic learning and so the acceptance of electronic in-service trainings will be higher by them than the other teachers.

e) *Field of study*: different fields of study are different by nature in using updated sciences. During their study, the students must coordinate their own learning and educational system with different learning methods and systems. This obligation in some fields such as the technical and engineering fields of study is higher than humanities. So it is expected that the graduates of the engineering fields of study welcome the new learning methods (such as the electronic trainings) than for example the graduates of the humanities.

f) *Ethnicity*: do the mental structures of the individuals from different ethnicities affect their acceptance of the educational and learning methods? This is a socio-cultural factor that we attempt to study in this research.

Economic situation

According to the available studies in the literature, next to the socio-cultural factors, economic barriers have to be placed in the second rank of the effective factors on the underdevelopment of electronic learning.

Technical and technological (software and hardware) factors

Another group of factors that has to be studied is the efficiency of hardware and software factors, computers knowledge, and connectivity to the network with regard to their effectiveness on the acceptance of electronic trainings by the target population. This group includes some factors as follow:

a) *Level of computer knowledge and literacy*: lack or shortage of teachers' computer knowledge is one of the main problems and reasons for "informational underdevelopment" and "cultural underdevelopment". Computer literacy is indeed the knowledge of the requirement of information age and the ability to use informational applications. The computer literacy is one of the most important prerequisites of the active and smart participation in this area.

b) *Owning a computer*: the educational need for electronic learning will be met if all teachers access to internet-connected computers. This is while

such an access is not possible for many teachers in remote cities and villages.

c) *Level of traditional trainings:* it seems that the traditional methods of learning are effective on the formation of learning habits in persons; and the higher amount of attending in traditional in-service training can be effective on resistance against the change of method from traditional one to the modern electronic method due to the unconventional nature of the educational environments.

d) *Level of electronic trainings*: perceived usefulness or uselessness of technology in learning, attitude to technology, facilitating conditions, application efficiency, and educational compatibility (skills of technology application) so that the educational compatibility is directly and positively related to the technology application. Moreover, the attitude to the technology has a strong effect on technology acceptance and technology-based learning. The other factor is ICT literacy which is very effective on using the technology. It is expected that the persons who have been affected more by a method, tend to keep continuing that methods more than the others.

Legal factors

It seems that the characteristics of the persons with different official posts and positions, their level of business, their time and place limitations, their status of employment (the nature of their contract) of the target population is effective of accepting the type of in-service trainings. This dimension is another factor that was focused in this study with regard to its effectiveness on the acceptance of electronic in-service trainings in the target population.

a) *Position*: in their research on relationship between the electronic in-service trainings and the empowerment of high school teachers, Nasiri, et al. (2011) found that there is not any significant relationship between the demographic variables (gender, work experience, and education) and the electronic learning; but the relationship between the empowerment and work experience of the subjects is significant.

b) *Type of the employment*: the next important factor is the official and legal status of the teachers with regard to their type of the contract (including official/non-official and part-time/full-time nature of their employment). It seems that the official full-time teachers are more open to accept new learning methods because their job is secure and they have specific plans for their job and intend to continue their job as teacher.

Findings of the research
Socio-cultural factors

Socio-cultural factors (age, gender, education level, field of study, ethnicity, and geographical area) have the highest rate of effectiveness on the acceptance of electronic in-service trainings in Iran. The qualitative and quantitative development of the electronic training requires the development of all educational management systems.

a) *Age*: being interested in new learning and teaching methods require spending more energy, seeking diversity, and being open to new experiences. Since the electronic training is a new method, it is expected that the teachers in different ages show different reactions to the acceptance of electronic training as a method that depends on special systems and facilities. Moreover, it is expected that the resistance against the electronic training increases with the rise of the age. According to the findings of this research, the highest mean of accepting electronic trainings belonged to the teachers with 40 to 45 years old, and the lowest rate of accepting electronic trainings belonged to the teachers with 30 to 35 years old. Variance analysis shows no significant difference at 0.05 level of significance (p= 0.548 >0.05). Thus the significant relationship between age groups in accepting the electronic trainings (and consequently the hypothesis of the research) is rejected and the effect of the age on the acceptance of electronic in-service trainings by the subjects of the research is not confirmed.

b) *Gender*: in this research we compared the acceptance of electronic in-service trainings by two gender groups. The findings showed that there is a significant difference between the male and female teachers with regard to the acceptance of electronic in-service trainings. The comparison of the obtained means show that the mean of the acceptance of electronic in-service trainings in men is higher than women. Thus the first hypothesis of the research is confirmed for the effectiveness of the age factor on the acceptance of electronic in-service trainings.

c) *Marital status*: since the married persons are usually busier and their time for learning is more limited than the single persons, it is expected that the acceptance of electronic in-service trainings is different by the married and single teachers. The findings of this research show that there is no significant difference between the married and single subjects in terms of their acceptance of electronic in-service trainings. Thus the effectiveness of marital status on the acceptance of electronic in-service trainings by the target population is rejected.

d) *Level of education*: considering the qualitative and quantitative development of Iranian universities and the increase of using digital, audio and video media in education, the previous students who are now

the teachers are willing to use diverse educational media and make them interested in learning new and different methods. The findings of this research showed that there is no significant difference between different educational levels in terms of their acceptance of electronic in-service trainings; and so the hypothesis of the research concerning the effectiveness of the education level on the acceptance of electronic in-service trainings is rejected. This finding is consistent with the findings of another research entitled the "the relationship between education and empowerment of secondary school teachers Famenin city" that showed there is no significant difference between the demographic factors (including gender, education level, and work experience) and e-learning (Nasiri, et al, 2011).

e) *Field of study*: different fields of study are different by nature in using updated sciences. During their study, the students must coordinate their own learning and educational system with different learning methods and systems. This obligation in some fields such as the technical and engineering fields of study is higher than humanities. Thus the teachers' field of study was considered as one of the effective factors on the acceptance of electronic in-service trainings. The obtained findings showed no significant difference between the teachers with different fields of study in terms of their acceptance of electronic in-service trainings and hence the relevant hypothesis of the research is rejected.

f) *Ethnicity*: the necessity of studying the mental structures of the individuals of different ethnicities and their effect on the acceptance of educational methods made us consider the ethnicity as a factor under the cultural group of factors. According to the findings of the field studies, we found that there is no significant difference between two ethnical (local and non-local) groups and hence the effect of ethnicity on the acceptance of electronic in-service trainings by high school teachers of Iranian Bandar Abbas City was not confirmed.

Economic situation

A very important educational factor in this area is the educational economy that shows the mutual effects of economy and education on each other. According to the available studies in the literature, next to the socio-cultural factors, economic barriers have to be placed in the second rank of the effective factors on the underdevelopment of electronic learning. The rate of wages and salaries, and the suitability of the teachers' economic situation were studied under the economic factors. The results of the descriptive statistics for the acceptance of electronic in-service trainings by the teachers in different economic welfare show that the highest mean of acceptance belonged to the group of average economic situation, while the lowest rate of

acceptance belonged to the group of low economic situation. Moreover, the variance analysis for comparing the acceptability of electronic training among different economic situations showed that the difference between the mentioned groups in terms of accepting electronic training is not significant and thus the relevant hypothesis of the research is rejected.

Technical and technological (software and hardware) factors

a) *Level of computer knowledge and literacy*: according to the results of the descriptive statistics for the acceptance of the electronic in-service trainings by the teachers with different levels of computer literacy, the highest mean belonged to the group of "proficient" and the lowest mean belonged to the "weak" group of computer literacy. Moreover, the variance analysis for comparing the acceptability of electronic training among the groups with different levels of computer literacy showed that the difference between the mentioned groups in terms of accepting electronic training is significant and thus the relevant hypothesis of the research is confirmed. Additionally, the paired comparison of the acceptance of electronic in-service trainings among different groups showed that the weaker computer literacy the lower acceptance of electronic in-service trainings.

b) *Owning a computer*: statistical analyses show that there is no significant difference between computer-owned group and computer-less group in terms of the acceptance of electronic in-service trainings. Thus the relevant hypothesis of the research about the effect of owning a computer on the acceptance of electronic trainings is rejected.

c) *Level of traditional and electronic trainings*: analysis of the level of passed traditional and electronic training courses by the teachers of the research show that there is no significant difference between the two groups in terms of the acceptance of electronic in-service trainings. Thus the relevant hypothesis of the research on the effectiveness of the level of passed traditional and electronic training courses on the acceptance of electronic in-service trainings is not confirmed.

Legal factors

a) *Position*: descriptive statistics on the acceptance of electronic trainings in the subjects with different official posts and positions show that the highest mean of accepting electronic in-service trainings relates to the group of managers, and the lowest mean belonged to other positions. Nonetheless, the variance analysis for comparing the acceptability of electronic training among the groups with different official positions showed that the difference between the mentioned groups in terms of

accepting electronic training is not significant and thus the relevant hypothesis of the research is rejected.

b) *Type of the employment*: the findings of the tables of research using independent t-test to compare the acceptance of electronic in-service trainings between two groups of "official teachers" and "unofficial" teachers show that there is a significant difference between the two groups in terms of the acceptance of electronic in-service trainings. Moreover, the comparison of the means show that the mean of the acceptance of electronic in-service trainings by the official teachers is higher than unofficial teachers, thus the relevant hypothesis of the research concerning the effect of the type of employment on the acceptance of electronic in-service trainings is confirmed.

Suggestions and solutions for developing the acceptance of electronic in-service trainings by the high school teachers

Since the perceived usefulness or uselessness of technology is effective on the learning, and the attitude to technology, facilitating conditions, and efficiency are directly related to the technology use, thus it is necessary to create positive attitudes before administering the electronic in-service trainings.

On the other hand, ICT literacy and skills are highly effective on the acceptance of electronic in-service trainings. Thus the teachers need to acquire ICT literacy and skills before attending any electronic in-service training course. Moreover, technical and technological (hardware and software) barriers have to be overcome because such barriers play an effective role in the underdevelopment of e-learning.

Since the age, marital status, level of education, field of study, ethnicity, economic situation, owning personal computer, level of passed in-service training courses, and the posts and positions of the teachers are not effective on the acceptance of electronic in-service trainings, thus the educational planners can plan in-service courses regardless of the age, marital status, level of education, field of study, ethnicity, economic situation, owning personal computer, level of passed in-service training courses, and the posts and positions of the teachers.

Additionally, since the difference between the computer-literate and computer-illiterate persons was significant in terms of the acceptance of electronic in-service trainings and the relevant hypothesis of the research was confirmed, thus it is necessary to promote the computer literacy of the teachers before administering electronic in-services trainings for the teachers.

Finally, since the mean of the acceptance of electronic in-service trainings by the official and unofficial teachers was significantly different

and the official teachers had a higher mean than the unofficial teachers (confirming the relevant hypothesis of the research), thus it is suggested to focus on the official teachers for administering electronic in-service trainings.

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THE SYNCHRONIZATION OF HUMAN DIMENSION FACTORS IN DETERMINING MILITARY COMMAND CLIMATE

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Abstract

Military combat readiness has well-established procedures for gauging the preparedness of units for deployed combat operations. Such readiness evaluations typically include assessments of unit level tactical proficiency, equipment serviceability checks, manning levels, audits of logistic stocks and supply processes, and reviews of each unit member's individual readiness status. This health diagnosis prescribed as command climate looks only at the tangible quantitative factors which can be pre-determined prior to combat duties. The intangible human dimension factor encompasses the morale, physical, and cognitive components of soldier, leader, and organizational development and performance. This is essential to raise, prepare, and employ the military in full spectrum operations which are not measured to complement the combat readiness factors. Despite recognition by military leaders throughout history that the human dimensions of capability are crucial to operational effectiveness, formal assessments of the psychological aspects of readiness appear to be the exception rather than the norm in today's military forces. Technology can provide the tools and avenues by which wars are fought but it is the individual soldier on the battlefield facing life and death who remains a constant.This paper looks at the literature on the synchronization on all the human dimension factors to complement the combat readiness to establish the combat command climate of a military organization. The paper promulgated that there is a need for quantitative assessment through questionnaires in all the human dimension factors which must be tabulated to individuals in organizations   which includes a scoring worksheet to indicate the level of readiness both combat and human dimension readiness before being deployed for military combat duties.

Introduction

The military cannot afford to focus only on current operations as a predictor of the future. It must prepare people so that future commanders can sustain operations in a time of persistent conflict. In spite of the amazing advances in technology, however, organizations continue to be plagued by ineffectiveness caused by flawed human (group) processes. Notwithstanding, the human dimension, not technology, remains the decisive element in most commercial and military activities. Judgment, creativity, and the synergy of teams remain a distinctly human phenomenon. Research shows that capability, especially in military organizations does not only relate to infrastructure capability but also includes intangible elements such as morale and motivation of soldiers in performing a military mission [1, 2,3,4]. In the military culture, soldiers often go beyond that which is needed, required, or expected in the performance of their duty or in other words, go beyond the call of duty. Furthermore, serving in the military is not just a career or a profession, but also a way of life that affects all aspects of soldiers' lives.

Faced with the demanding, all-consuming obligations, commitments, and sacrifices required by the Army, soldiers experience the challenge of balancing military work requirements and lifestyle with family and personal needs. The desire in military duties requires the tangible quantitative factors and the intangible human factors in cognizance to achieve both the desired results individually and collectively.

The US Army began in the early 1970s to investigate whether human dimensions and psychological readiness are important for combat performance [5]. It was reported that trends towards increased violence and isolation on the battlefield have led military planners around the world to place increased emphasis on the psychological and human dimensions of force readiness [6]. Significant research on morale has been conducted by the Israeli Defence Force. The first study was done by Guttmann [7] in 1949. He assessed soldiers' satisfaction with "arrangements" in their bases and their "mood" [8]. Guttman's term "mood" is most probably a substitute term for morale and the analysed data from a morale survey administered during 1981 in the Golan Heights [9]. During the late nineties a research on perceived combat readiness was conducted to ascertain the relationship between morale and combat readiness of soldiers [10].

This paper looks at the literature on the synchronization on all the human dimension factors to complement the combat readiness to establish the combat command climate in a military organization. The current

Situational Force Scoring (SFS) which is the established tool in measuring tangible and quantitative requirements for combat duties will not be accounted for in this paper. The human factors needs to perform in concert to assist the commanding officer to establish the readiness of the soldier and his unit in general to complement the combat readiness of a military organization. They are needed to quantify the readiness of the unit prior to combat engagement. This paper will look at the human dimension factors of soldiers in meeting the challenges of the current and future operating environment in the moral, physical and cognitive domain in congruence to the man, machine interface whereby leadership skills will provide the major challenge. A climate assessment will be discussed using the best practices of command climate of established armies to spearhead this assessment from an individual soldier leading to a collective valuation of the unit in particularly the Malaysian Army.

Military Culture in Combat Readiness

Every organization has its own unique organizational culture, which directly and indirectly affects and influences all aspects of the organization [11]. The military provides the foundation and platform for soldiers with the logistic support merging into the high technological advances in the defence industry to perform in military duties. The military culture trains soldiers to perform in all conditions and the comradeship is essential in performing their duties. Modern military forces are concerned with the survival and effectiveness of their soldiers on the battlefields of today and tomorrow, and that are constantly concerned with integrating human and technical systems. This distinct culture consists of a variety of inherent, implicit and explicit functions, processes, characteristics, and manifestations that dynamically unite an organization [12].What factors propagate this attitude or behavior and this exemplification of devotion, dedication, and selfless service? In particular, what drives soldiers' sense of duty, loyalty, and commitment, influencing their attitude and behavior and ultimately, duty performance? Within the South African context,indicates that faith, good morale and leadership, motivation, organizational and command cohesion, group norms and culture are important for success in battle [13]. "Culture is usually defined as social or normative glue that holds an organization together" [14] (1983, p. 344). An organization's culture, which is based on shared commonalities, creates an organization's context, establishing the framework for how it exists. The shared commonalities, such as values, meanings, and understandings, derive and perpetuate formal and informal structures and relationships, operational practices and procedures, collective values and beliefs, norms, and patterns of behavior [15, 16]. Holistically, the organizational culture propagates a shared frame of reference and the

organization's shared reality, establishing a means by which people see and understand the happenings within their organization [17, 18].

The concept "combat readiness" is characterized by a proliferation of definitions. The evidence for readiness is mixed because of different definitions for readiness being used in the major surveys [19]. Some of the definitions by various academicians are as shown in **Table 1**.

DEFINITION OF COMBAT READINESS	AUTHOR
A psychological attribute in terms of a soldier's choice or degree of commitment to, and persistence in effecting a certain course of action	Gal (1986)
"Combat readiness" acts as an inadequate bridge between motivation and morale within the military context	Lord Moran's statement (cited in Richardson, 1978)
Conceptualised the term "human readiness for combat" in terms of three variables, namely Individuals' Mental Readiness, Unit Readiness, and Actual Performance in Combat.	MacDonough and Blankinship (cited in MacDonough, 1991)
Combat readiness as the concept as the state of preparedness of a unit to perform its assigned role	Ministry of Public Works and Government Services of Canada (1997)
Combat readiness as the measure of a force conducting operations successfully against a hostile force.	Lutz (1997),
Generalship, leadership, operational and tactical planning and execution, logistics, intelligence and a host of other factors are critical for combat performance	Hooker (1998)
Combat readiness as a grocery list for war with quantifiable items that can be tallied, bought and paid for	Summers (1998)
Combat readiness in the US Army is measured by resources such as soldiers, leaders, equipment, ammunition and fuel. These resources, however, simply enable readiness and have always been an inadequate yardstick for readiness. Therefore he argues that the moral dimension should also be included	Rosenberger (1999)

Table 1: Various Definition of Combat Readiness by Academicians.

The current combat readiness is measured through the Situational Force Scoring (SFS) whereby their objective is to improve the representation of ground force close combat in aggregate combat models that use scores of one form or another to compute force ration, attrition and movement as a result of combat [20]. But this method does not measure the intangible factors of human dimension to synergize the unit readiness. SFS seeks to accomplish the first objective by adjusting the scores dynamically to reflect of the type of terrain, type of battle, and combined arms imbalances or shortages of each side's effective forces scores. The SFS methodology significantly mitigates many long standing problems of aggregate models such as their underestimating the relative value of light units even in

situations where they are in fact highly effective, even more effective than armoured units [21].

Two aspects of combat readiness can be identified which is the psychosocial dimension (psychological attributes) and the material dimension (e.g. the number of tanks and their serviceability, the availability of ammunition). Various authors emphasize the importance of the psychosocial dimension (the human factor)in battle and during deployments [20,21,22,23,24,25,26,27]. This view is expressed in the United States Department of the Army's Field Manual 100-1 , which states that the readiness of a military force owes as much to the soldiers' state of mind as it does to his training and operational equipment. The process of looking at the material and training only is a mechanistic and structured process. Individual soldiers may have the best equipment and may receive the best training possible, but if they do not have confidence or trust in their abilities, equipment, personnel and training, their mission is most likely to fail. Therefore, it can be concluded that combat readiness is not only about equipment, training and capability, but more importantly, it is about the individual's and the group's state of mind. This state of mind includes their perception of their own combat readiness. In other words, combat readiness consists of two interdependent dimensions: the Psychosocial Dimension and Material Dimension. The confirmation of this interdependency indicatesthat motivational factors are interactive and not additive [30]. Combat readiness is therefore conceptualized in terms of an overlap between the psychosocial aspects (mental or human aspects) and the means at the disposal of the soldiers to conduct war (non-human aspects).

The focus of this paper is, however, being on the psychosocial aspects. The non-human indicator of combat readiness, such as the physical serviceability of military equipment,is not part of this study. Therefore, it is important to measure the soldiers' perceptions of the various building blocks. The following definition of combat readiness is proposed: the individual and/or collective state of mind of a soldier or a group of soldiers that will determine their performance during military operations. This state of mind is a function of the social trust and confidence these soldiers have, their worries and concerns, their familiarity with the enemy and the frontage, morale, and preconceptions of the opposing force. Confidence, social trust and morale are made up of various building blocks. Combat readiness can be conceptualised in terms of consisting two interdependent dimensions i.e. the tangible and intangible elements. **Table 2** provides a list of some of the research and studies done on these elements and variables in the various domains.

VARIABLES	AUTHORS
Combat Readiness	Norazman (2000), Nelson (2006), Morgenthau (2005), Betts (1995), Saaty (1980), Saaty (2008), United States Department of Defence (2010), Malaysian Army (2011), Griffith (2002), Wolosin, Wilcove & Schwerin (2003), Malaysian Armed Forces (2010), Moore (1991), Mumford (1976), Bester and Stanz (2007), Filjak and Dencic (2005), Goyne (2004), Meijer and Vries (2005), Knorr (1970), Clausewitz (1874),Griffith (1971), Paret (1989), Australian Army (2008).
Capability	Andrews and Shambo (1980), Norazman (2000), Shafritz et al. (1989), Luman (2000), Voith (2001), Zanella (2012), Australian Army (2008), Malaysian Army (2010), United States Army (2008), Malaysian Army (2011), Malaysian Armed Forces (2010).
Morale	Bester and Stanz (2007), Gal (1986), Schumm et al. (1996), Goyne (2004), Cartignani (2004), Johnston, Brown, Cole & Agrawal (2002), Riley (2002), Murphy and Farley (2000), Knorr (1970), Siebold (1999), Britt, Castrol and Adler (2006), Shamir et al. (2000), Gal and Manning (1987), Snider and Watkins (2000), Baynes (1987), Slim (1956), Morgenthau (1978), Buzan (1983).
Quality of Life	Rath and Harter (2010), Rice (1984), Blishen and Atkinson (1980), Verwagen (1980), Zapf (1980), McKennell (1978), Kerce (1992), Kerce (1995), Saris et al. (1996), Moller (1992), Campbell (1976), Andrews and Withey (1976), Green (2001), Saaty (1994), Saaty (2008).

Table 2 - Variables and Authors Of Literature Review (Source Kwong,2013)

The Human Dimension Characteristics ofa Soldier

Many authors are of the opinion that Xenophon[1] was the first military writer to give attention to soldier morale when he stated that it is not numbers and strength that bring victory to war, but the army that goes into battle "stronger in soul"; their enemies generally cannot withstand them. Maurice de Sac [31] stated twenty centuries later that the human heart is the starting point in all matters pertaining to war. A century later this was echoed by Napoleon's dictate that the moral is to the physical as three is to one, and in the end the Spirit will always conquer the sword [32,33]Du Picq's work introduced the notion of soldier morale and had, up to then, the widest influence over the development of military theory and speculation about combat behaviour [34]. In the early 1970s the US Army investigated whether human dimensions and psychologicalreadiness which are important for combat performance [35]. This led to the publication of Field Manual 100-5 (Department of the Army, 1983) which states that wars are fought and won by men, not by machines, and that the human dimension of war will be decisive in the campaigns and battles of the future [36].

There are broad definitions of psychological readiness that encompass factors such as physical and mental fitness, unit cohesion, commitment to the organisation, self-reported preparedness to deploy, and assessed technical competence (both job-related and broader military skills). However, this paper has adopted a simple definition: Individual readiness is

the "extent to which an individual is prepared, able, and motivated to perform his or her job as part of the larger military mission" [37]. Collective readiness is the second critical dimension of psychological readiness: collective readiness. Just because the individual soldier may feel ready for operations dos not mean that he or she will feel the unit is ready and vice versa. Collective readiness refers to the individual soldier's beliefs about the ability of his or her work group or unit to be effective on operations. It is assumed often that the individual soldier's sense of his or her own operational readiness will predict or strongly influence their impression of the unit's readiness to deploy. However, there is evidence that perceptions of collective readiness are more likely to influence the soldier's own sense readiness than the other. This definition recognizes that soldier readiness everything from training proficiency to motivation to well-being is fundamental to the military's future success [38]. It introduces the concept of holistic fitness, a comprehensive combination of the whole person including all components of the human dimension triad. The Army leverages enhanced means to identify, access, retain, and develop soldiers with unsurpassed cognitive, physical, and social (moral and cultural) capabilities. Soldiers are enabled by technology, cognitive, medical and social sciences to achieve excellence in small unit competence and to dominate increasingly complex operational environments. Soldiers are able to leverage technologies and processes that optimize and restore cognitive and physical performance.

Technology, intelligence, and operational design can reduce uncertainty and ensure confidence. However, commanders must still make decisions based on incomplete, inaccurate, or conflicting information. These factors will continue to play a predominant role in the environment of future full spectrum operations. US Military Academy, Department of Systems Engineering, West Point conducted a research on the Whole Soldier Performance [39] which displays the final functional hierarchy of US soldier performance attribute groupings in the moral, cognitive, and physical domains as seen in **Figure 1**.
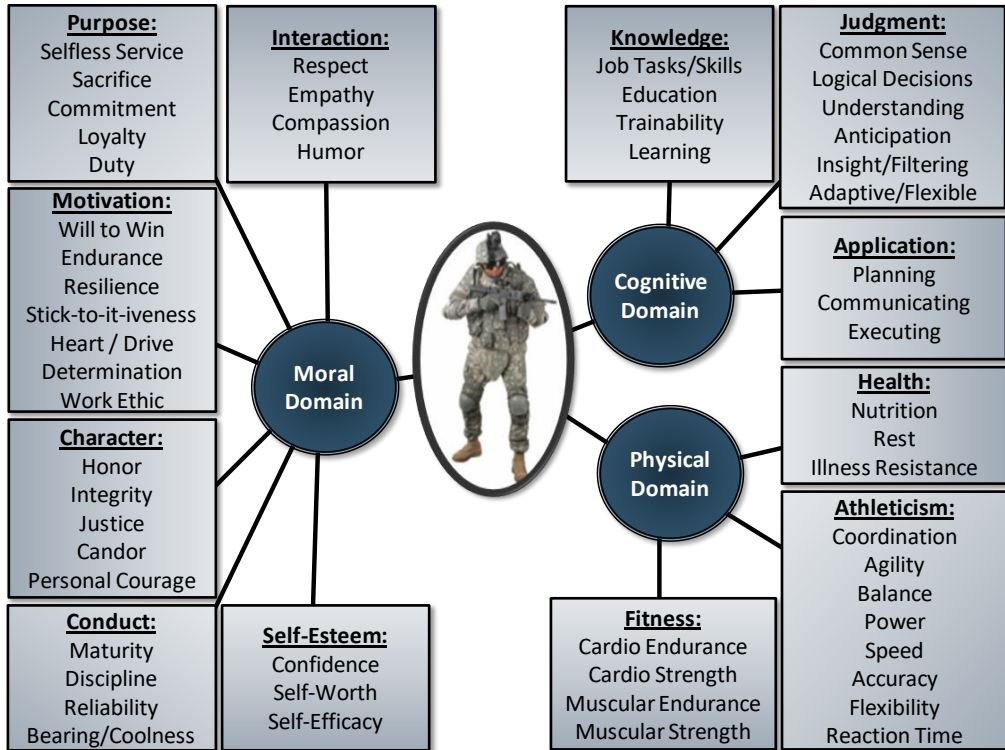
Figure 1. Whole Soldier Performance Attributes. (Source:Dees,2006)

The morale domain provides the recipe necessary for a soldier and his unit to perform in concert in a battlefield. All things being equal, the force with the best trained small units will win, but even if all is not equal, the side with the best skilled soldiers and determined small units will usually defeat larger and sometimes even better equipped units [40]. du Picq's work introduced the notion of soldier morale and had, up to then, the widest influence over the development of military theory and speculation about combat behavior [41].

Within the morale domain, the Army culture that previously focused on major combat operations must begin to shift to a culture that recognizes changes in the Army's role and responsibilities including a broader range of military operations [42]. Purpose relates to why a soldier does things. The main sentiment of those consulted centers around selfish versus unselfish attitudes. Motivation relates to the level of effort that soldiers demonstrate to accomplish the mission. Character relates to the manner in which soldiers accomplish the mission. Conduct relates to how soldiers carry themselves. We desire soldiers that display maturity and discipline leading to a balanced life.   Interaction characterizes the attitudes that a soldier demonstrates towards other members of the team. The first level baseline expectation is

that soldiers always display respect towards others.   Self esteem characterizes the attitudes that a soldier holds concerning himself/herself [43].In the cognitive domain which is related to the cognitive psychology which is the branch of psychology concerned with the scientific study of the mind.The mind creates and controls mental capacities such as perception, attention, and memory, and creates representations of the world that enable us to function [44]. The simple vs. choice reaction time [45] and the forgetting curve for nonsense syllables [46] are examples of early experimental research on the mind.Because the operation of the mind cannot be observed directly, its operation must be inferred from what we can measure, such as behavior or physiological responding. Knowledge refers to the information possessed by soldiers and their ability to assimilate additional information. Relating to the information currently possessed, we desire soldiers that have a mastery of their specific job tasks and a strong basis in general Judgment refers to a soldier's ability to effectively process information and make logical decisions. With the information they have, soldiers should understand what is relevant, filter out the irrelevant, and gain insight into situations through a systematic thought process. Applicationrefers to a soldier's ability to translate decisions into effective actions. Once a decision has been made, we desire soldiers that can develop a plan to accomplish the desired end state. In the physical domain, fitness indicates that soldiers are fit in the traditional sense of the word [47]. In academic settings, this is referred to as the health-related components of fitness. These components are somewhat measured with the current Army physical fitness test and include cardiovascular and muscular endurance and strength [48]. Athleticism can be considered functional fitness, and was consistently the first set of attributes mentioned in the physical domain during our consultation. Health indicates that soldiers maintain their bodies in accordance with well-known principles of rest and nutrition. Nutrition and rest play major roles in energy levels, resistance to illness, and body composition.The human dimension is described as the *"moral,* cognitive, and physical components of soldier and organizational development" and states that "Army concepts acknowledge the soldier as the centerpiece of the Army, but none, individually or collectively, adequately addresses the human dimension of future operations." [49]. Within the context of the expected future global operating environment, this study looks in depth at expected soldier performance in the moral, physical, and cognitive domains.

Command Climate Profile

        Command climate is a perception among the members of a unit about how they will be treated by their leaders and what professional opportunities they see within the unit. Command climate will determine the health of your

unit. These will the elements which contribute to a positive command climate. The deployment of units in the Malaysian Army needs to be confounded by answering the questions of "Are the troops ready for combat duty". How do we measure such intangible factors such as the leadership style, welfare, morale, team work, unit cohesion, mind set and other components which provide a dimension together with tangible factors required for combat duties such as manpower issues, logistics and trained personnel. At such a profiling on soldiers' working climate need to be determined so that military leaders at all level is able to leverage the status of the soldiers in relation to their working environment [50]. The key to a positive command climate is credibility of the commander, communication, trust, and confidence. Keeping this in mind, command climate is a state or condition existing from shared feelings and perceptions among soldiers about their unit, about their leaders, and about their unit's programs and policies. This condition is created by the commander and his chain of command from the commander's vision and leadership style, and influenced and perpetuated by their communication and their leadership

In this era of persistent conflict, a unit's command climate is vital to long-term success at all levels of war in tactical, operational and strategic. Command climate is the culture of a unit. It is the way a unit "conducts business." The leader of the organization is solely responsible for the organization's command climate. Commanders at all levels establish this climate by what they say and what they do. Character-based leadership is the bedrock requirement for a successful command climate.Unit "climate" factors such as cohesiveness, morale, and attitude toward training have a direct impact on the effectiveness of a military unit.The earliest examples of a unit morale survey were produced by Lewis Guttman in the newly formed Israeli Army in 1949 [51]. Guttman's original questionnaire looked at basic concerns such as satisfaction with barrack living conditions and arrangements, etc [52]. However, as the Israeli Defence Force (IDF) became increasingly embroiled in combat actions throughout the region, combat readiness became the primary focus of morale related research. The work undertaken using Combat Readiness Morale Questionnaire (CRMQ) was instrumental in identifying the core factors that determine personal and unit level morale for fighting troops [53]. He conducted a factor analysis on the CRMQ results of over 1200 IDF troops about to engage in a 'contingent operation' in Lebanon in 1981 [54]. He found two items in particular were highly associated with personal and perceived company morale, 1) perceived unit togetherness and 2) relationships with commanders. In addition, a factor analysis of the 30 items in the questionnaire revealed eight factors that accounted for 52% of the variance for his sample, including 1) confidence in senior commanders, 2) confidence in one's self, team and weapons, 3) unit

cohesion and morale, 4) familiarity with the mission and frontage, 5) confidence in immediate commanders, 6) enemy evaluation, 7) the legitimacy of the war, and 8) worries and concerns. As a result of this work the term 'unit climate' to describe a higher-order factor that appeared to be a better predictor of combat readiness than morale alone [55].

While preparing for combat is still the major focus of research into the human component of military effectiveness [56], it is not the only concern for commanders. This is especially true in certain countries where the majority of military units are not engaged directly in combat actions. Additionally, even though an increasing number of personnel are being deployed on missions overseas, the nature of those missions is rarely direct combat. Consequently, while unit commanders are always concerned about the preparation of their troops for battle, their main priorities are more likely to be stemming the flow of resignations, preventing inappropriate behaviour, or ensuring the effectiveness of communication in the unit [57]. This shift in priorities does not diminish the importance of combat readiness but addresses the reality of peace time soldiering. The importance of organisational issues is reflected in the US Army Command Climate Survey [58]. The CCS focus on practical concerns that fall within the unit commander's power to change (e.g., morale, leadership and equity issues). The CCS is designed to be administered, analysed and interpreted by the CO without recourse to any outside agency. It is also a mandatory requirement for newly appointed COs both at the beginning of their command and twelve months after taking up their post. There is no normative data for the CCS, but given that the results of the first administration of the survey largely provide a baseline for an incoming CO, the true measure of the COs leadership and impact on the unit is gauged at the 12 month point. The CCS is an example of an attitude survey and the main advantages of this type of instrument are that they are short, easy to administer, and COs can quickly gain a measure of the views of their troops without requiring any particular interpretation [59].

Since 1996, the Canadian Forces have been administering the Human Dimensions of

Operations survey to Canadian Forces personnel deployed on Peace Support operations.Measuring dimensions such as morale, cohesion, confidence in leadership and stress, amongstothers, the Human Dimensions of Operations survey provides Commanding Officers with a toolto measure and monitor important human dimensions that affect operational readiness andeffectiveness of deployed units [60]. In developing the model, which is not conclusive, and continues to undergo review as data is gathered and analyzed, emphasis was placed on predictors, effects and outcomes associated with unit effectiveness with each examined across three levels:

organizational, group and individual. This model has formed the basis for the development of the Unit Morale Profile. The UMP was designed to explore the relationships between a number of variables and outcomes such as resignations and perceived satisfaction in the unit. The questionnaire comprised 14 sub-scales which not only measured the causes of problems within a unit but also measured the effects (e.g, cohesion, organizational commitment, quality of life, and psychological wellbeing), and outcomes (e.g, perceived satisfaction with group performance and plans to leave the organisation). The UMP measures 14 dimensions namely role stress, work motivation, job satisfaction, psychological distress, quality of life leadership style, confidence in leadership, cohesion, communication, climate, preparedness for deployment, perceived organizational support and organizational commitment, job performance, retention/attrition [61]. While extremely comprehensive the UMP was clearly too long and cumbersome for use on the ground, and a major review was undertaken to shorten the instrument [62].

As a result a new streamlined version, known as the Profile of Unit Leadership, Satisfaction and Effectiveness (PULSE) produced by the Australian Defence Force (ADF) eventually replaced the UMP. With the introduction of the Profile of Unit Leadership Satisfaction and Effectiveness (PULSE) in 2004, Australian commanders now have a tool available to measure a range of factors about their personnel [63].This instrument retained the underlying tri-level structure of individual, group and unit, but introduced a new dimensional structure comprising six core constructs as shown in **Table 2**

VARIABLE	CONSTRUCTS	AUTHOR
Job Stress	Derived from the Occupational Environment Scale – Form2	Osipow, & Spokane, 1983
Job satisfaction	Derived from the Job Satisfaction Survey	Specter, 1985
Work Motivation	The Work Motivation Scale	Pelletier, Fortier, Vallerand & Briere, 2003
Communication	Derived from the Communication Satisfaction Questionnaire	Downs & Hazen, 1998
Confidence in Leadership	From the Unit Climate Profile Human Dimensions of Operations Questionnaire	ARI, 2006
Teamwork/Cohesion	Derived from the Group Environment Questionnaire	Widmeyer, Brawley & Carron, 1985

Table 2. Profile of Unit Leadership, Satisfaction and Effectiveness (PULSE) Variables, Constructs and Authors

The purpose of this new model was to observe the linkages between each core construct, to provide an overall view of the climactic interrelationships operating within the unit as shown in **Table 3** [63].In

developing the UMP/PULSE the authors incorporated a number of scales developed within the industrial/organisational research community. As a consequence, the instrument requires a solid understanding of this theory to interpret effectively and is not immediately intuitive like an attitude survey.

The PULSE Model Predictors	Indicators	Outcomes	Level Of Effect
Policies & practices Unit climate Operation Tempo Perceived organisation support	Esprit de corps Organisational commitment Organisational satisfaction	Unit performance Intent to leave unit/ADF	UNIT
Leadership styles Communication	Group cohesion Job satisfaction Confidence in leadership	Group performance Intent to leave working group	GROUP
Role stressors Competencies	Health Motivation Job satisfaction	Individual performance	INDIVIDUAL

Table 3: The Australian PULSE Model

The United Kingdom Armed Forces uses the Armed Forces Continuous Attitude Survey (AFCAS) as their instrument for organizational command climate. The MOD uses the Armed Forces Continuous Attitude Survey (AFCAS) to collect information on the attitudes, opinions and circumstances of serving personnel. The main report of the AFCAS includes tables of response data for all of the survey's questions and full details of the conduct and analysis of the survey.

Synchronization of Human Dimension Factors For Command Climate Assessment

This research is seeking a set of instrument to measure such intangible cognitive factors to complement the tangible combat readiness for units to be deployed. The research will identify and synchronize all intangible factors influencing command climate of a Malaysian Army Brigade and Battalion. This is by developing a validated and reliable instrument to measure command climate in the Malaysian Army. The outcome is designing a scoring worksheet to determine status of command climate in unit. This instrument will also take preventive measures and also corrective measures after establishing the score of an individual, unit and an organization. The *Improved Man-Machine Interfaces* research area is motivated by the fact that technology designed to enhance soldier performance often imposes both physical and cognitive stress on the soldier in ways that equipment developers do not envision. Specifically, this paper focuses on understanding the interaction between physical and cognitive

stress and their effect on individual dismounted soldier and small team performance. The assessment needed to undermine the intangible human factors for this research will focus on the morale factors which will be seeking the elements of the moral component.Elements of the morale component: The Warrior Spirit, with its moral-ethical foundation, and socio-cultural awareness. The morale component strongly relates to the physical and cognitive components of the human dimension. The moral component directly affects the Army's combat effectiveness. Spirit, as used in this concept, is that intangible sense of self and of purpose, which provides drive and motivation. Spirit is what an individual athlete or team possesses that somehow enables them to triumph over others in competition [64]. The Army places great emphasis on its proud heritage of selfless service, discipline, the wear and appearance of uniforms, customs of the Service, values, and teamwork to build *esprit de corps* and cohesive teams and units. Developing the human spirit includes self-reflection and self-awareness, and individual assumption of responsibility for developing a broad concept of a meaningful life, faith, and social awareness.Faith is the strong belief in what constitutes ultimate truth or value. One of the world's religions provides the basis for the faith of many soldiers. Though not everyone finds faith through religion, most people develop some level of faith in a person, philosophy, an institution, or a nation. Morale is an intangible, dynamic characteristic that strengthens confidence in oneself, one's equipment, the unit, and the unit's leadership [65]. Morale generally consists of common purpose, identity with, and a personal commitment to a unit; and confidence, enthusiasm, and persistence within a military framework. High morale is a characteristic of effective units.

The determinants of morale are both individual and group-related, reflecting their interdependence with unit cohesion and esprit de corps. The characteristics and perceived legitimacy of the mission affects morale. Mission factors become especially important in operations whose purpose, objectives, definitions of success, and duration change over time, but nothing has a greater influence on morale than perceived success in accomplishing the mission. Living conditions and rations naturally concern soldiers. Leaders must balance efforts to provide creature comforts with maintaining fighting fitness and accomplishing the mission. The Army must continue to provide the best possible care and living conditions to the Soldier now and in the future, but never at the expense of the mission. Esprit de corps and cohesion,while less tangible than weapons systems, can prove the old axiom of the whole being greater than the sum of its parts. In a military context, cohesion is the bonding of soldiers within their organizations their morale, will to fight and commitment to each other, the unit, and mission accomplishment. Like morale, esprit de corps is a dynamic relationship

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whose strength is dependent on many factors.Unit cohesion aids commanders in establishing the environment to anchor individual morale. Unit cohesion will help to extend the reach and coverage of units. Primary cohesion has two components: horizontal, or peer bonding, and vertical, or soldier to leader, bonding. Military group cohesion develops beyond just primary groups at four interrelated levels: peer (horizontal), leader (vertical), organizational (battalion, regiment) and institutional (Army). Building cohesive units is important today and in the future, because it contributes to building and maintaining morale and because it enhances unit performance and reduces discipline problems.There is currently no instrument to measures such intangible factors in the Malaysian Army and there is a need to look at other armies such as from US, UK, Australia and Canada to design a set of questionnaires correlated with a scoring worksheet to determine the combat readiness of the unit. There is a need to create a validated and reliable instrument that can measure such intangibles to provide Brigade/Battalion Commanders and top management of the Army a clear and unified picture of unit combat readiness and effectiveness.

Conclusion

Command (organizational) climate has become an increasingly significant prerequisite for unit effectiveness and combat readiness as shown by many established armies all over the world. While many Army units enjoy positive command climate, too many do not. Several adverse trends in command climate have persisted in the Army for nearly 30 years (since the end of the communist terrorist threat). Command climate is one of the most observed and least understood concepts in the military. A goal of every commander today is a healthy command climate and a cohesive unit. The human dimension encompasses the moral, physical, and cognitive components of soldier, leader, and organizational development and performance essential to raise, prepare, and employ the Army in full spectrum operations. Army concepts acknowledge the soldier as the centerpiece of the Army, but none, individually or collectively, adequately addresses the human dimension of future operations. The soldier performance attribute groupings in the moral, cognitive, and physical domains provides a platform for the intangible factor needed in the human interface in man machine method. The machine is just a tool for the soldier in battlefield and the tactics is the method but overall the soldier is the platform using all his training in cognitive reasoning in making significant decisions in the battlefield whereby the machine an method is just the psychomotor aspect in assisting him meet his goals. The objectives of this study are to provide an 'audit trail' of the rise of the command climate concept in hopes of arriving at an understanding of the idea; discuss its

recognition, controversial nature, purpose, application and linkage; review the awareness and acceptance problem; identify existing means of evaluating the concept; suggest ways of improving a unit's command climate; and last, make several conclusions and recommendations about command climate. It is recommended that this study be reviewed by The Malaysian Army Training Division, Army Human Resources Department and other Leadership Divisions; shared with future commanders at the Pre command Course; and considered for publication Army-wide.

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KNOWLEDGE OF SEXUALLY TRANSMITTED DISEASES STDS IN KADUNA METROPOLITANTS, NIGERIA

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Abstract

The study employed survey design in investigating the knowledge of the Sexually Transmitted Diseases STDs in Kaduna metopolitant, Kaduna State, Nigeria. A Sample of 237 (caregivers and adolescents) was used for this study. Four research questions and four null hypotheses were formulated. Statistical means was used to answer the research questions and t-test was used in testing the null hypotheses. The results show that: caregivers and adolescents know very little about the forms of STDs, the students have moderate knowledge of the signs and symptom of various STDs, male and female caregivers had agreed with mode of transmission, and the control measures toward STDs. Based on the above findings recommendations were made among which are: School Psychologists, counsellors should continuously sensitize the caregivers and adolescents, and organize group guidance programme in school on personal health and risky behaviour, and there should be synergy between health twisters, school administrators and parents in creativity awareness among caregivers and adolescents on the risk factors, symptom and control of STDs, and voluntary HIV test before marriage, poverty alleviation programme to re address the epidemics among others are made.

Keywords: Knowledge of Sexually Transmitted Diseases (STDs), Forms, Symptom, Mode of Transmission, Control, Caregivers and Adolescents.

Introduction

   Adolescent has been described by Coleman and Hendry (1990) as a period of experimentation. According to them, one of those issues adolescents experiment on is sex. This explains, perhaps, why UNICEF (2004) noted that adolescents are the most heterosexually active cohort the world over. Similar sentiments (Ezedum 2000, Oluwole, 2008) have been shared in Nigerian concerning the Nigerian adolescent. Erickson (1968) as cited in Okoye (2003) maintained that the hazard of adolescent is role confusion / search for personal identity. During these period adolescents encounter such problem like falling in love with opposite sex and changes in their physical features (males and females alike) which may knowingly a unknowingly lead to teenage pregnancy , abortion and its complications, prostitution, sex abuse and sexual violence, and the spread of sexually transmitted diseases (STDs) including Human Immuno-deficiency Virus/Acquired Immuno-deficiency Syndrome (HIV/AIDS). All of these do affect school programs and sometimes even lead to dropping out of school of Nigerian youths, which by implication influence the development of the nation.

   Acquired Immune Deficiency Syndrome (AIDS) is a serious and deadly disease caused by the virus that attacks and destroys the body defense system, thereby leading the body defenseless (Unachukwu, 2003). The body becomes open to infection and diseases which the body could normally fight off, it is becoming obvious that AIDS possess a serious health problems in Africa. Obekeze (1997) state that AIDS is the greatest scourge of modern times, thus it is the most important new threat to the world health body and has no cure Since its discovery in the early 1980s, HIV/AIDS has become a pandemic on a global scale. It is no longer only health issue but a substantial threat to economic growth and development, imposing a heavy burden first on families, then on communities and eventually economics. The impact of the pandemic is already being felt in most countries of the world. An estimate of 11 persons became pandemic is already minute representing some 15,000 new infections every day or more than 5.4 million for the entire year (WHO, 2000). Similarly, the Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated that as at 2003, about 38 million persons were HIV positive worldwide and almost 26 million were workers between 15 and 49 years, and of the 2.9 million HIV/AIDS related deaths in 2003, 2.2 million were from Sub-Saharan Africa. While the Sub-Saharan Africa region contain only 10 percent of the world's population, it accounts for 60 percent of the worldwide HIV/AIDS cases (UNAIDS Africa Fact Sheet, 2004). This implies that the most productive age group is mostly affected and this has implications for families and economics in terms of income, employment and labour market changes.

Nigeria, the most populous country in Africa with a population estimate of about 140 million in 2006 (NPC, 2007), is fast gaining its share of the HIV/AIDS scourge. Nigeria has the highest prevalence rate in West African Sub-region and the third highest prevalence of any country in the world with a five percent population prevalence rate, that is, over 3.6 million people (UNAIDS/WHO, 2004). The widespread and rising HIV/AIDS is a problem that could be affecting the growth of the Nigerian economy which, led to compounding poverty, low standard of living, low productivity, increased unemployment, morbidity and mortality rates and ultimately obstruct development efforts. Thus, with the alarming growth of the disease within the country, the study is concern with the possible effects of HIV/AIDS on economic growth in Nigeria and the extent to which various polices can alter them (Maijama'a & Muhammad, 2013).

However, the situation in developing countries shows that the diseases occur predominantly in the heterosexual populations, and therefore, heterosexual contact in these areas is considered a major risk factor of infection. Besides, the disease has been observed in intravenous drug abusers, hemophiliacs, and recipients of blood transfusion or blood products. Some cases of AIDS originating from organ transplantation have been recorded. For Achalu (1993) AIDs is a group of diseases that result from the infection with the AIDS virus.

The traditional values among Nigerian for sanctity of sex and sex for procreation have been over thrown in favour of liberal sexual behaviors. There is evidence of high risk of sexual behaviour and premarital sexual involvement among Nigerian adolescents (Unachukwu and Nwankwo, 1998). The commonest STDS include HIV/AIDS, Trichomoniasis, General Warts, Syphilis, Herps, Genitalia Tines Crunus, Scabies and Gardenerella Veginalis. Others are Hypphorgramutoma, Verecem, Choncroid and Vereophobia (Nnankwo, 2003). the tragedy of the premarital sexuality among adolescents is that they engage in frequent sexual activities without proper knowledge of what is involved (Obikeze, 1997). Achalu (1996) maintained that, those who engage in high risk behaviors such as indiscriminate sex with many partners or those who take partners from the streets have increased chance of being infected. Owolabi (1985) emphasized that, sexual practices such as anal intercourse, oral intercourse, homosexuality and deep kisses are associated with high risks of contacting these diseases especially the Virus that causes AIDS. Furthermore, Owolabi (1985) noted that some of the prevalence of STDS in Nigeria is due to sexual promiscuity, prostitution, and homosexuality, lack of sex education, self medication and drug abuse among others. Adolescents especially those in secondary schools are among the most sexually active segment of the population. They are also more likely to engage in risky sexual practices that

increase the chances of infections (Hopkins, 1998). AIDS have causes a number of complications including abortions, premature birth, blindness, infertility, heart and mental diseases, bone disorders, and so on. Effort to reduce the problem in controlling the diseases among patients who do not go to doctors at the early stage of the diseases due to stigma attached to the disorder related to sex organ. In spite of the modern medicine, STDS have become very difficult to control largely because people seem not to know the truth about them.

Related literature

Unachukwu (2003) investigated that, the level of awareness on the aetiology, and clinical pictures of HIV/AIDS among adolescents. The research was carried out in Anambra State. The population was about 20 thousand students in the secondary schools in the urban and rural locations in the State. Then, 2500 SS1 and SS2 adolescents were used as sample. They were selected through multiphase sample techniques. Their schools were selected through simple random sampling, while 100 students were used from each of the 25 selected schools. They were however, chosen from SS1 and SS2 classes. The instruction for data collection was QAAECA. Direct approach was used in teir administration by the help of research assistants. Statistical mean was used in answering the research questions. The finding showed that the adolescents are lacking the knowledge of the aetioloby, epidemiology and clinical pictures of HIV/AIDS.

Nwachukwu (2003) investigated that the knowledge and attitude of secondary school students towards sexually transmitted disease in Anambra State. A sample of 2500 SSII students made up of 1450 girls and 1050 boys was used. A questionnaire titled QSKATSTD was developed, structured and validated. Four research questions and two null hypotheses were formulated for the study. Statistical weighted mean was used to answer the research questions and t-test was adopted in testing the null hypotheses. The result showed that: the students know very little about the forms of STDs, the students have poor knowledge of the signs and symptoms of various STDs, the students know little about the modes and of control of transmission, the students have very poor attitude towards STDs, there is, however, significant difference in the boys and girls knowledge and attitude towards STDs,

Maijama'a and Muhammad (2013) investigated that, the impact of HIV/AIDS on economic growth and development in Nigeria using primary and time series data. It also looked at the effect of the epidemic on savings and standard of living. To obtain the primary data, a total of 360 respondents comprising 180 persons infected with HIV/AIDS and 180 uninfected persons were selected sing stratified sampling technique. The primary data was analyzed using frequencies, percentages and chi-square test. In analyzing the

time series data, a Solow-type growth model is extended to incorporate some of the macroeconomic consequences of HIV/AIDS. Using this model, co integration and error correction modeling techniques were adopted to examine the relationship between the variables. The findings show that HIV/AIDS prevalence is widely spreading and rapidly rising and has a negative impact on Real GDP growth in Nigeria. Also, recurrent health expenditure does not appear to be growth augmenting during the period HIV/AIDS was also found to adversely affect savings and standard of living of infected persons.

Anagbogu (2003) investigated that, examined adolescents' perception of HIV/AIDS symptoms as sources of early death among Nigerian youths. A total of 100 male and female students were randomly chosen from ten schools located at old Oyi local government area of Anambra State. A questionnaire on HIV/AIDS symptoms was administered. The findings of the study indicated that the adolescents do not associate high death rate of youths with HIV/AIDS symptoms. The study further showed that the youths associate high death rate with witchcraft and evil practice in the Nigerian society. Unfortunately, the youths are the view that HIV/AIDS is one of the techniques with witchcraft society utilized in destroying the Nigeria youths.

Objectives of the study

The objectives of this study include:-
- To determine the level of awareness of different forms of STDS as perceived by the Caregivers and the Adolescents.
- To find out the extent do Caregivers and Adolescents knows the signs and symptoms of STDS.
- To determine the mode of transmission of STDs as perceived by the Caregivers.
- To examine the Caregivers' levels of knowledge of control measure of STDs.

Research Questions

The following research questions guided this study:
- What is the level of awareness of different forms of STDS as percieved by the Caregivers and Adolescents?
- To what extent do Caregivers and Adolescents knows the signs and symptoms of STDS?
- What is the mode of transmission of STDs as perceived by the Caregivers?
- What are Caregivers' levels of knowledge of control measure of STDs?

Research Hypotheses
The following null hypotheses were stated for this study:
- Caregivers and Adolescents will not differ significantly on their measures of awareness of various forms of STDs.
- Caregivers and Adolescents will not differ significantly on their mean score of Symptoms and Sign of STDs.
- Male and female Caregivers will not differ significantly on the mode of transmission of STDs.
- Male and female Caregivers' will not differ significantly on the levels of knowledge of control measure of STDs.

Methodology
The study is a survey design meant to seek data on the knowledge of the subjects on sexually transmitted diseases. A sample of 237 respondents made up of 105 Caregivers and 132 Adolescents in Kaduna metropolitan, Kaduna State , Nigeria were used for the study. Simple random sampling technique was used in selecting the subjects. The researcher made use of questionnaire tagged; Awareness of forms, symptoms, mode of transmission and control (AFSTC) of STDs. It was structured on four (4) point Likert scale items and divided into four sections A, B, C, D and validated by three experts in Psychology, Medicine and Measurement and Evaluation. Their contribution led to the dropping and addition of some items. Also to determine the reliability of the instrument, it was giving to 50 caregivers and students in SS II in Katsina State, Cronbach alpha was used in the analyses. Which yielded the coefficient alpha for the four sections was 0.76, 0.72, 0.82 and 0.85 respectively. The researcher employed the service of research assistants in collecting the data which was done through direct delivery approach. The data collected were collated and analyzed, using statistical means for the research question and t-test to test the null hypotheses (a cut of point of 2.50 indicate acceptance level while below indicate rejection of the items by the respondent).

Results
The results of the study were presented in tables based on the research questions and the null hypotheses formulated to guide this study.
Research Question 1: What is the level of awareness of different forms of STDS by the Caregivers and Adolescents?

Table.1: The mean responses of Caregivers and Adolescents of the awareness of different forms of STDS

Respondents	N	$\bar{X}$	SD
Caregivers	105	2.68	0.608
Students	132	2.89	0.643

Table .1 Shows that both caregivers and adolescents agreed conveniently to the perceived level of awareness of STDs. This is evident from the mean score of 2.68 for caregivers and 2.89 for adolescents with SD of 0.608 and 0.643 respectively, which are all above the criterion mean of 2.5. in the Table, the mean score of the adolescents was slightly higher than that of caregivers.

Question 2: To what extent do caregivers and adolescents knows the signs and symptoms of STDS?

Table 2: Mean responses of caregivers and adolescents on the extent of the signs and symptoms of STDs.

Respondents	N	$\bar{X}$	SD
caregivers	105	3.22	0.297
Students	132	3.19	0.298

Table.2 shows that both caregiver and adolescents, agreed with the signs and symptoms of STDs. That is evident from the mean score of 3.22 and 3.19, with SD of 0.297 and 0.298 of caregiver and adolescents respectively, which are above the criterion mean of 2.5 in the Table; the mean score of caregivers was slightly higher than that of the adolescent counterparts.

Question 3: What is the mode of transmission of STDs as perceived by the caregivers?

Table.3: The mean responses of male and female caregivers on the mode of transmission of STDs.

Gender	N	$\bar{X}$	SD
Male	74	2.86	0.520
Female	31	4.77	0.583

Table 3 Shows that, both male and female caregivers agreed with the on the mode of transmission of STDs. This is evidential from the mean score of 2.86 with SD of 0.520 and 4.77 with SD of 0.583 for both male and female caregivers respectively, which is above the criterion mean of 2.50. In the Table, the scores of female caregivers was slightly higher than that of their male counterparts. This shows that, caregivers are aware of only very few signs and symptoms of the venereal diseases of STDs.

Research Question 4: To examine the caregivers' levels of knowledge of control measure of STDs.

Table.4 the mean responses of male and female caregivers on the levels of knowledge of control measure of STDs.

Gender	N	Mean	SD
Male	74	2.84	0.501
Female	31	3.27	0.197

From Table .4 shows that both male and female caregivers conveniently agreed with the level of knowledge of control measure of STDs. This is evident with a mean score of 2.84 and 3.27 (both male and female) respectively, with SD of 0.501 and 0.197; which is above the criterion mean of 2.50 the mean score of female caregivers was slightly higher than that of their male counterparts.

Hypothesis one: Caregivers and Adolescents will not differ significantly on their measures of awareness of various forms of STDs.

Table 5:Independent t-test statistics on difference between Caregivers and Adolescents on various forms of STDs.

In Table 5 it was observed that the calculated t. value of 15.85 is greater than the critical t. value of 1.96 and 0.05 alpha level of the null hypothesis is rejected. This means that the Caregivers and Adolescents will not differ significantly on their measures of awareness of various forms of STDs, in favour of the caregivers .

Group	N	$\bar{X}$	SD	Df	t-cal	t-crit	Decision
caregivers	105	7.63	1.103				
Student	293	5.57	1.251	396	15.85	1.96	Rejected

Hypothesis Two: Caregivers and Adolescents will not differ significantly on their mean score of Symptoms and Sign of STDs.

Table 6: Independent t-test statistics on Caregivers and Adolescents will not differ significantly on their mean score of Symptoms and Sign of STDs.

Respondent s	N	$\bar{X}$	SD	Df	t-Cal	t-Crit	Decision
Caregivers	105	6.11	0.698				
Adolescents	293	6.41	0.595	396	3.92	1.96	Rejected

Table 6 also rejected that the calculated value of 3.92 is greater than the critical t-value of 1.96 and 0.05 alpha level. This means that Caregivers and Adolescents will not differ significantly on their mean score of Symptoms and Sign of STDs. But this was in favour of the caregivers.

- **Hypothesis Three:** Male and female caregivers will not differ significantly on the mode of transmission of STDs.

Table 7: Independent t-test statistics on Male and female caregivers will not differ significantly on the mode of transmission of STDs.

Caregiver	N	$\bar{X}$	SD	Df	t – cal	t-crit	Decision
Male	74	2.86	0.517				
Female	31	2.82	0.583	103	0.33	1.96	Accepted

Table 7 shows that the calculated t-value of 0.33 is less than the critical t-value of 1.96 and 0.05 alpha level. The null hypothesis is thereby accepted. This means that Male and female caregivers will not differ significantly on the mode of transmission of STDs.

Hypothesis four: Male and female caregivers will not differ significantly on the levels of knowledge of control measure of STDs.

Table 8: Independent t-test statistics on male and female caregivers will not differ significantly on the levels of knowledge of control measure of STDs.

Caregiver	N	X̄	SD	Df	t-cal	t-crit	Decision
Male	74	2.84	0.501				
Female	31	3.27	0.197	103	6.32	1.96	Rejected

Table 8 also shows that the calculated t-value of 6.32 is greater than the critical t-value of 1.96 and 0.05 alpha level. The null hypothesis is thereby rejected. This means that male and female caregivers will not differ significantly on the levels of knowledge of control measure of STDs, but in favour of the female caregivers.

Discussion

The finding reveals that no significant differences exist between caregivers and adolescents on knowledge of the various forms, sign and symptoms of sexually transmitted diseases. This findings is in line with the early finding of Achalu (1996),Unachukwu(2003),and Anagbagu(2003), maintained the adolescents do not associate high death rate of youths with HIV/AIDS symptoms. The study further showed that the youths associate high death rate with witchcraft and evil practice in the Nigerian society. Unfortunately, the youths are the view that HIV/AIDS is one of the techniques with witchcraft society utilized in destroying the Nigeria youths.Evidence has shown that most students continue to regard STDs wrongly as a moral rather than medical problem. The psychological nature of the disease and the fact that these STDs are contact mainly through intimate sexual contacts with infected individuals has made it one of the most feared diseases known to man. But the attitudes towards sex and the wide spread ignorance about STDs, the rate of the spread has become a syndrome (Hopkins, 1998 & Myles 2001).

Furthermore, this study revealed that no significant differences on the mode of transmission ,and control measures of sexually transmitted diseases as perceived by the male and female caregivers.

This could be the more reason why the present day adolescents have more liberal and permissive attitudes and behaviors towards premarital sex. Achalu (1996) emphasize those who engage in high risk behaviors such as indiscriminate sex with many partners or those who take partners from the

streets have increase   chances of being infected (Hopkins, 1998).STDs are not just health related problems, but constitutes social problems, with grave consequences to the individual and the society at large. Unackwuku and Nwanko (1988) maintained that the disease can lead to pains, discomfort, physical disabilities, mental and emotional suffering and in some cases, death. Young students are extremely at risk of acquiring and transmitting STDs because of the sexual behavior, which from this study lacks the full knowledge of what STDs (Nwankwo, 2003) measures to include proper medication social re-orientation, proper sensitization and a change in the attitudes of the secondary school students towards STDs and sexuality related problem of students should be emphasized (Maijama'a & Muhammad, 2013; Owolabi 1985; Unachukwu ,2003).

Conclusion

Based on the findings of this study it can be deduce that, there is very high risk of spread of STDs among young persons in the society, but the present studies will help the caregivers and adolescents to be aware of various forms, signs, symptoms, mode of transmission and control STDs. There is therefore, an urgent need for responsive Counselling services in Nigeria schools and the society at large.

Recommendations

From the finding of this study, the following recommendations are made:

1. School Psychologist and counsellors should organize group guidance programme for caregivers and adolescents in school system, churches and recreational centre with the aim of educating young people about STDs. The content of the programme should be ways to reduce the risk of STDs.
2. Voluntary HIV Test before marriage should be emphasized.
3. Expansion of Anti-Retroviral Drugs (ARD) should made available s to HIV patient.
4. Government should introduce programme to reduce poverty at individual family as well as community levels such programme should include home base care for people with HIV/AIDS, foster care for AIDS orphans, food programme for the children and support for educational experience.
5. Sex education should be build into school curriculum in senior secondary school classes (SSS I-III). To include:
   ✓ To inform people and to help them make intelligent decisions and take actions that will improve or promote health,
   ✓ To enlighten the public about the problems of STDs.

✓ To secure support for STDs control.
✓ To educate people about the risk factors contributing to STDs.
✓ To encourage people to avoid or reduce the risk of infection.
6. Psychologist and Counsellors should always organize group guidance services on healthy leaving were they will be educating the adolescents on the risk behaviours and their consequences as well as predisposing factors.
7. Federal and state governments should assist the psychologist and Guidance and Counsellors in providing pamphlets and printed materials on STD and HIV/AIDS education.

Suggestions
        Further studies should be geared towards adolescent perception of mode of transmission and control of STDs in Nigeria and rest of Africa in general.

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TEACHER RESEARCH: PRACTICE, CHALLENGES AND PROSPECT FOR IMPROVEMENT:
AN EMPIRICAL STUDY FROM OMAN

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Abstract

This study investigates teachers' conceptions of engagement with, and in, teacher research (TR) in the Sultanate of Oman. The data collected through interviews and questionnaires reveals that TR is not yet common practice in Omani schools. To make TR a sustainable mainstream activity within school environments should entail improving teachers' concepts, attitudes, and understandings of the role of TR in the development of educational system and for their own professional development. Teachers should also be provided with logistical requirements and practical conditions that help them become active and competent practitioner researchers.

Introduction

Teacher research (TR) was first presented in the 1970s by Lawrence Stenhouse and has recently been introduced to the school system of the Sultanate of Oman. Since the commencement of the 2007/8 academic year, teachers at all grades, specializations, genders and districts are encouraged to conduct academic research, which has also become a main subject in Post-Basic Education (PBE) schools (Year 12). This research curriculum focuses on providing students with opportunities to develop their own learning through self-reliance (Ministry of Education, 2009). To promote teacher engagement in research practice, two annual national competitions, one for

each students and teachers, are organised by the Ministry of Education, with the winning research projects or papers acknowledged and rewarded.

Most of the teachers in general education in Oman, are Omanis (male and female) who graduate from educational colleges and universities both inside and outside Oman. Teacher training in Oman includes research skills courses and trainees are required to do a final year research project. Therefore, these teachers are familiar with research. The questions which still remain are whether they practice research and read research articles after graduation from university? Also, should introducing a research culture into schools in Oman make the target educators competent researchers by default? To the best knowledge of the researchers, studies on TR in Oman are limited to Alfarsi (2006) and Borg (2007 & 2013) who emphasize the need for follow up research. This study then aims at contributing to the findings of previous research and filling any potential gaps in the understanding of school-teachers' conception, use and practice of TR in schools of the Ministry of Education, and enabling stakeholders to make informed decisions for the improvement of initiative and development of policy.

To accomplish its target, the study poses the following research questions (RQs).

1. What is the teachers' perception of the role of research in the development of the Omani educational system?
2. To what extent do teachers engage in research?
3. What is the teachers' attitude towards participation in research?
4. What hinders teachers from research and what do they perceive assists them to overcome such obstacles?

Background to General Education in Oman

The Ministry of Education has been the main provider of pre-tertiary education in Oman. At present, the system contains two concepts: Basic Education (BE) and PBE (Post-Basic Education). BE was launched in 1998/99 to replace GE, which was a twelve-year program divided into three stages: Elementary- 6 years, Preparatory- 3 years and Secondary- 3 years. BE has two stages: Cycle 1 (Year 1-Year 4) and Cycle 2 (Year 5-10). It provides basic educational needs as to information, aspects of knowledge and skills, as well as the development of objectives and values that enable the learners to proceed in education and training according to their tendencies, readiness and abilities (Ministry of Education, 2009).

PBE encompasses Years 11 and 12 aiming to further develop students' basic skills as well as providing them with job skills and career planning techniques to enable them to become active members of society, and to be able to take advantage of opportunities in education, training and

work after school. A major distinguishing factor of PBE is that it seeks to enable students to become effective users of self-learning and research skills (Ministry of Education, 2009).

Literature review

Unlike many ideas in education which vanish once confronted by new competing ideas, teacher research (TR) that was proposed by Stenhouse has proven itself and the call for teacher engagement in research has become even stronger nowadays (Dana & Yendol-Silva, 2003; Simms, 2013 and Borg, 2013). The concept is accepted in many education systems around the world and gains attention from researchers and theorists of various disciplines and backgrounds so that, as Reise-Jorge (2007, p 403) notes "the diversity of contexts, aspirations, epistemological and methodological orientations of teacher-research makes it difficult, if not impossible; to arrive at a general agreed definition of the concept". It is perceptible that TR is discussed in literature under different concepts such as teacher-research (Lytle and Cochran-Smith, 1989; Rust, 2009), teachers' research engagement (Borg, 2007), enquiry-oriented teacher education (Lucas, 1988), classroom research (Campbell, 2013), practitioner researcher (Robson, 1993), and teacher self-study (Roulston Legette, DeLoach, Bukhalter-Pittman, Cory, & Grenier, 2005). Furthermore, TR also gains elaboration in publications on main stream education research e.g. Robson (1993); language teaching research e.g. Nunan (1992) and Borg, (2013); action research e.g. Parsons and Brown (2002), Ponte (2010), Dobber, Akkerman, Verloop, & Vermunt (2012) & Mills (2003); teacher education e.g. Loughran (2010); and teacher professional development e.g. Snow-Gerono (2005). The core concern of all these concepts, as Borg (2013 p 8) concludes, is "inquiry conducted by teachers in their own professional contexts".

Available literature investigates TR utilizing two methodologies. The first tract considers TR in pre-service teacher training either at degree or higher education levels. Examples of studies focussing on university courses in TR are Dobber et al, (2012), Reise-Jorge (2007), Loughran (2010), Simms (2013) and Donnell & Harper (2005). The second track, within which the present study falls, contemplates TR done by teachers while in-service. Within this category, come studies that are undertaken by university academics aiming at engaging a group of school teachers in research to explore to what extent what they gain from such experience, reflects on their classroom practices, knowledge and professional developments. Examples of these types of studies are Henson (2001); Atay (2008); Chandler-Olcott (2002); Jurastaite-Harbison and Rex (2005) and Maeijer, Oolbekkink, Meirink, & Ditte (2013). There are also studies e.g. Beycioglu, Ozer, Niyazi & Ugurlu (2010) and Alfarisy (2006) that focus on teachers not necessary

engaged in TR, trying to understand their perceptions of TR, the difficulties they encounter, and the support they require in order to become practitioners in research. In addition, there are studies which discuss TR on educational and/or social theoretical basis' attempting to establish a link between theory and practice in education. Examples of these types of studies are Ponte (2010); Lytle & Cochran-Smith (1989); Loughran (2010); AdomBent, Fischer, Godemann, Herzig, Otte, Rieckmann & Timma (2014); Rust (2009); Avalos (2011) and Dana, Gimbert, & Silva (2001).

Teacher-research is defined as "systematic and intentional inquiry carried out by teachers in their schools and classroom" (Lytle & Cochran-Smith, 1994 p 24) to achieve different aims such as teacher professional development (Lytle and Cochran-Smith, 1994; Simms, 2013 and Dana et al, 2001), reflective teaching (Parsons & Brown, 2002), democracy in education (Buxton, Kayumova & Allexsaht-Snider, 2013), school reform (Dana et al, 2001); making classroom teaching evidence-based (Verma & Mallick, 1999; Kincheloe, 1991 and Borg, 2007 & 2013), informed policy making and establishing a balance between university based theoretical educational research and practical classroom practice (Rust, 2009). Certainly, none of the previously listed aims are out of the scope of argumentative debates among specialists, yet engagement in TR might conclude with achieving one or more of them.

For example, researchers affirm that TR is a vehicle for teacher professional development (Dana et al, 2001) which basically includes the existing knowledge a teacher possesses, how to gain new knowledge, and how to transform that knowledge into classroom practice to the benefit of the students (Avalos, 2011). Specialists in teacher professional development prefer TR to the traditional methods of professional development which are usually administered in terms of short workshops conducted by insiders or outsiders but do not typically relate to classroom practice. It is argued that TR makes professional development an on-going process fostering the teacher's ability to become an independent learner, inquirer and knowledge generator (Borko, Jacobs & Koeliner, 2010 and Meijer et al, 2013). It is also argued that the impact of engagement in TR on teachers' professional development is evident in enhancing teacher creativity, self-confidence, and producing the knowledge the teacher needs in the classroom (Borg, 2007; Dobber et al, 2012 and Parsons & Brown, 2002).

Furthermore, TR intersects, at different points, with another component of teacher professional development, namely reflective teaching (also called reflective practice). First, the teacher's attention in both TR and reflective practice is directed towards what happens inside the classroom and the teacher-students interchange for the sake of improvement of the students' accomplishment. Second, in both situations, teachers collect data about his or

her students using similar tools, such as observation, interviews, exams results and records. Third, reflection is a default end result of research position, in that the researcher teacher is required to sit down at the end of the research and consider how to use the research results for the development of the students and the improvement of classroom instruction (Parsons & Brown, 2002; Avalos, 2011; Loughran, 2010).

The debate on academy and TR, which is still on-going, demonstrates a serious gap between theory and practice in education. On one hand, teachers question the value of academic research, maintaining that research done by academics is too theoretical and of indirect implication to the teaching reality (Beycioglu et al, 2010; Bevan, 2004; Ektz, 2006; and Mortimore, 2000). Teachers also maintain that academic research cannot replace the practical experience that teachers gain from day-to-day involvement in classroom practice. Many teachers are consequently not interested in any engagement in research. Closing the gap between theory and practice, and establishing a balance between school and university should be achieved, as McLaughlin (2004) maintains, by encouraging teachers to do research. Not only that, but taking part in research should make teachers' voices heard and should give them the opportunity to express their points of view. It is also advocated to make education more democratic (Cochran-Smith & Lytle, 1990). This view is supported by the opinion that classroom research makes classroom teaching evidence-based (Verma & Mallick, 1999; Kincheloe, 1991 and Borg, 2007). It is believed that a classroom teacher is not only a source of authentic and valuable knowledge about what goes on in the classroom, but also the most reliable source of such information. Supporters of this view dictate that a teacher who spends most of the time with the students in the classroom is more qualified to speak about them than assigning that authority to external researchers or experts who scarcely stay in the classroom.

However, not all specialists believe that TR is reliable when it comes to its contribution to theory, planning and decision making (Simms, 2013). Anderson & Herr (1999) and Zeichner (2003) maintain that an explicit distrust exists in both the UK and USA of TR results and that some research by teachers in these countries is incomplete and therefore invalid (Meijer et al, 2013). Nuna (1992 & 1997); Murray (1992) and Myer (1985) affirm that TR should be evaluated in light of the criteria of academic research taught and practiced in universities, and any work not meeting academic research standards should not be looked at as research. Borg (2013, p 19) states "irrespective of the purpose of the inquiry, if it is to inform instructional decision making then confidence must exist in the trustworthiness of the findings". In reality, however, as Alfarisy (2006) and Reise-Jorge (2007)

note, not many teachers are familiar with and implement academic research standards in their research attempts.

On the other hand, Allwright (1997), Cochran-Smith & Lytle (1990) and Richardson (1994) advocate a less impressive opinion towards TR requirements. They advocate that teachers should not be asked to do research identical to academic research nor should TR be evaluated against criteria set up for academic research. This point of view is based upon a number of justifications, at the top of which is that teachers are too busy with teaching and have limited opportunities to study academic research methodologies that are usually offered in independent courses in universities. It is also argued that academic research methodologies can be replaced by one that teachers themselves derive from their classroom practices and school context. Finally, sustaining continuity in TR should not be confronted by challenging requirements which may prove beyond teachers' capacity to fulfil. It is also argued that TR results should be used for improving the researching teachers' capacities and the schools in which they teach, rather than to generalize their results. This view of the purpose of teacher research is relevant to that of Berthoff (1987) and Britton (1987) who contend that TR is a reflexive practice, so it does not require research methodology and data collection, but is rather an inspiration for teachers to notice what occurs in the classroom (Reise-Jorge, 2007). The problem with this conception of the purpose of TR is that it contradicts with the teachers' perception that TR results should be used for the improvement of education, and unless that is done, teachers would not like to take part in TR.

However, both university-school partnerships (Ponte, 2010) and collaborative research (Meijer et al, 2013; Ponte, 2013 and Anderson & Herr, 1999), are ideas brought forward to sustain quality and continuity within TR practice. There is a contentment that TR is more likely to yield satisfactory results when school teachers are engaged in research projects supervised by university lecturers (Dobber et al, 2012). In this case university lecturers provide research knowledge that teachers need to proceed with research, and overcome the challenges that they might face. In addition, university academics provide theoretical knowledge, while school teachers provide practical knowledge, assisting in closing the gap between theory and practice in educational research (Beycioglu et al, 2010).

Collaborative research means that teachers work in teams, rather than individually, to do research. It is believed that collaborative research encourages teachers to share responsibility, interchange information and experiences, distribute tasks and secure research quality (Meijer et al, 2013; 2009; Ponte, 2010; Anderson & Herr, 1999 and Lytle & Cochran-Smith, 1989). However, collaboration also requires a support flow from the surrounding environment, especially from peers and school management to

the researcher teacher or group of teachers (Ponte, 2013; Reis-Jorge, 2007; Snow-Gerono, 2005 and Meijer et al, 2013). Such cooperation enables teacher researchers to verify ideas, gain data and implement results. Regrettably, not all schools and educational systems provide the required support, nor do they adopt the recommendations of teacher researches (Lytle and Cochran-Smith, 1989; Schulz, 2010; Borg, 2013 and Snow-Gerono, 2005). Meeting teacher research efforts unsympathetically is counterproductive because researcher teachers are pragmatic, which means that they do not do research as a target by itself, but as a means for securing improvement in teaching and making changes in the educational system (Borg, 2013 Reis-Jorge, 2007). If education as an enterprise does not pay attention to research results and recommendations, then teachers will stop research. Alfarisy (2006) finds that only 16 teachers do TR out of 60 teachers who participated in his study. The teachers who did not do research believed that their schools had no plans for benefiting from their research results and recommendations.

All in all, a key issue in the literature remains that teachers' engagement in TR could be understood better when teachers' voices are heard, and their accounts of the highs and lows of the process are expressed and considered faithfully (Lytle & Cochran-Smith, 1989; Borg, 2013 and Simms, 2013). This study, therefore, tries to contribute to the existing debate by exploring teachers' perceptions of TR and how to make it a mainstream practice in teachers' community.

Methodology

Data was collected by questionnaires and interviews from 580 school teachers working in 4 educational districts in Oman namely Muscat, Al-Dakhilya, Sharqya North and Al-Dhahira. Questionnaires are used in this study because this tool has been considered rather practical in education research for collecting data from a large number of participants (Robson, 1993, and Nunan, 1992). To achieve this purpose, a questionnaire was designed in both Arabic and English and distributed to 547 randomly selected school teachers, see Table 1 below. Equality in numbers of participants from each district was rather difficult to maintain and deemed unnecessary as the study does not attempt a comparative analysis. Prior to final distribution of the questionnaire, validity was checked by peer review then a random sample of 30 questionnaires was used to check reliability using Cronbach's Alpha which showed 90%.

As to the analysis of the questionnaire, Sections 1, 2 and 3 were analysed quantitatively using SPSS and the results are presented in the forthcoming section. Mean is used as an indicator of overall agreement with each statement. In this sense, Means from 1 to 2.5 = low agreement; more

than 2.5 to 3.5 = medium agreement and more than 3.5 to 5 = high agreement. The open-ended questions were analysed qualitatively and he frequency of each answer was also calculated to provide information for:

    a. teachers' perceptions of the role of research in educational system;
    b. extent to which teachers engage in research;
    c. teachers' attitudes towards doing research;
    d. factors that hinder teachers from conducting research;
    e. participants' suggestions to engage in and with research.

Interviews were conducted with 36 teachers other than those participating in the questionnaire in order to sustain triangulation. Interviewees were asked to elaborate upon the following points: what they think research is; whether they believe research is beneficial for teaching and learning; whether they would like to participate in research; whether they have research skill and MoE support for TR. The interviews took place in Arabic, some of them are audio recorded and transcribed. Data collected by interviews analysed and presented in the analysis section below.

Table 1: Number and percentage of teachers who participated in answering the questionnaire from each educational district.

Educational Region	Gender				Total	
	Male		Female			
	number	percentage	number	percentage	number	Percentage of the total
Muscat	44	33.6%	87	66.4%	131	24%
Dakhilya	83	43.7%	107	56.3%	190	34.7%
Al-Dhahira	98	43.4%	128	56.6%	226	41.3%
Total	225	41.1%	322	58.9%	547	3.5% of the whole population of 15,747 teachers in Oman when the study was conducted.

Analysis

The data gathered by the interviews and questionnaires was analysed to answer the RQs. As explained earlier in the previous section, Means of responses to each degree of the five point scale categorised into three groups: from 1 to 2.5 = low agreement; more than 2.5 to 3.5 = medium agreement and more than 3.5 to 5 = high agreement. Relevant quotes from interviews and open-ended questions are presented.

1. Teachers' perceptions of the role of research in development of educational system in Oman

Analysis of interviews and questionnaire items 2, 3, 6, 14 & 23 which provide answers to RQ1 reveal that participants have two contradicting perceptions regarding the role of research in development of the educational system in Oman. In Table 2 below, items 1, 2 and 3 demonstrate that respondents had high agreement (Means around 4) with the idea that research has a role on the development of the educational system especially

at teacher level. This result is supported by interview data where 34 (94%) interviewees believed that research has an important role in education. It was stated that "research helps in solving problems". One teacher stated that "research improves teacher's skills and develop the curriculum". Another teacher explained that "research helps in identifying and solving the societal difficulties that hinder efficiency of education, even sometimes predict some of problems so they can be avoided". It is also stated that "research helps students solve their problems". One teacher stated that "in addition to teaching, research should be part of teacher's task because of the renewable nature of teaching and educational problems and that the teacher is always available in the field and familiar with those problems".

On the other hand, negative statements i.e. items 4 and 5 in table 2 below (Means are 3.52 and 3.62 respectively), indicate that there was another group of participants who had negative perceptions of the role of research in the development of educational system. This result is supported in statements quoted in the open ended part of the questionnaire that expressed negative attitude towards research. One teacher wrote: "we should not depend on research findings and theories which are taught in universities because they are based on societies other than the Omani society so they are irrelevant to our society". Other statements of perceptions were: "research has no impact at all on teaching and learning because research recommendations were never considered for implementation", "the general opinion towards research is negative because it is not used at all… many research projects have been done but they have no accountability". Two of the interviewees also lacked belief in the supportive role of research in teaching. One interviewee asserted that "research is not important because the educational problems need political decision to be solved rather that teacher's decision".

The study findings in this regard concur with what is stated by the relevant literature e.g. Borg (2013), Gall et al (2007), Beycioglu et al (2010), Bevan (2004), Ektz (2006), and Mortimore (2000) that some teachers believe on the role of research in improving education and others do not.

Table 2: Participants' perceptions of role of research in education system

No	Statement	Mean
1	Research helps in improving my professional skills and capabilities	4.06
2	Doing research helps me to understand the educational system	3.96
3	Research strengthens the relationship between school and society	3.91
4	Research has no impact on teaching and learning	3.62
5	Doing research does not help me solve my students' problems	3.52

2. Extent to which teachers engage in research

Data analysed under this heading contribute to answering (RQ2). Engagement in research, as clarified by Borg (2013) means that teacher read

published research and themselves do research. Both ideas are discussed below.

a. Extent to which teachers read published research

Data on extent to which teachers read published research was derived from responses to questionnaire Section 2, Question 1. As illustrated in Table 3 below, participants were not quite engaged in reading research: 36.8% maintained that they never read research papers, the majority 49.6% read between 1 and 5 papers per year, only 4.3% read more than 5 papers per year and 9.3% provided no response.

b. Extent to which teachers do research

Data for this point which contribute alongside the previous analysis to (RQ2) was gathered from responses to questionnaire Section 2, Question 2. As illustrated in Table 3 below, participants were not quite engaged in doing research: 60.7% never done any research, 29.1% did 1 to 5 research projects per year, 2.2% did more than 5 research projects per year and 8% provided no answers. This result agrees with AlFarsi (2006, p 28) who investigated 74 school teachers and comments that "I was really surprised to find few teachers had actually conducted classroom research". The obstacles that prevent teachers from carrying out research will be discussed in 4 below.

Table 3: Number of research read and done by participants per year.

Research papers read per year	number of respondents	Percentage	Research papers done per year	Number of respondents	Percentage
Nothing	206	36.8	Nothing	340	60.7
1-5	278	49.6	1-5	163	29.1
6 - 10	14	2.5	6 - 10	6	1.1
More than 10	10	1.8	More than 10	6	1.1
No answer	52	9.3	No answer	45	8.0
Total	560	100%	Total	560	100%

3. Teachers' attitudes towards doing research

Questionnaire items 8, 10, 16, 21, 27 and 29 set up to provide data for this analysis which answers (RQ3). Teachers' attitudes towards TR, as illustrated in Table 4 below, are not quite positive and demonstrate divergent feelings towards research. For instance, item 4 with (Mean = 3.90) shows negative attitudes towards TR, participants regarded 'TR as a waste of time and effort'. Similar attitudes towards TR also explicit in item 5, (Mean = 3.76) 'awards are not important and do not encourage me to do research', item 7 (Mean = 3.50) 'teachers do not need to do research' and item 9 (Mean = 3.41) 'asking teachers to conduct research is unfair because it puts an extra load on them'. On the other hand, good attitude towards TR can be inferred from, item 8 (Mean = 3.46) 'I feel happy when I conduct research', and item 10 (Mean = 2.86) 'I do not like research'. Deviating attitudes towards

research also shown by previous research. Fore example, Beycioglu et al (2010) found that 68% of the participating teachers consider research findings and 32% of the participants had never done so since entering the teaching profession.

Table 4: Statements and Means of respondents' attitudes towards doing research.

No.	Statement	Mean
1	Doing research is a waste of time and effort	3.90
2	Awards are not important and do not encourage me to do research	3.76
3	Teachers do not need to do research	3.50
4	I feel happy when I conduct research	3.46
5	Asking teachers to conduct research is unfair because it puts an extra load on them	3.41
6	I do not like doing research	2.86

4. Factors hinder teachers from conducting research

This analysis contributes to answering (RQ4). Data contributing to this point is collated from respondents' input for the questionnaire (question 1 and open-ended questions) and interviews where quotes from those two data sources are discussed below.

1. Lack of research knowledge and skills

Data derived from interviews and questionnaire demonstrates that teachers' lack of research skills and knowledge is one of the biggest obstacles that hinder participants' from doing research. Item 5 in the questionnaire demonstrates this (Mean = 3.64) 'I feel uncomfortable for being unfamiliar with the procedure of research', Out of the 36 interviewed teachers, 11 (330.5%) said that they had no idea at all about research. Others stated that their ideas about research are not clear, primitive, or they do not know the steps of doing research. Only 3 (8%) interviewees said they know how to do research.

Participants' concerns about their lack of research knowledge and skills were mentioned around 105 times in the open-ended part of the questionnaire as an obstruct to doing research. The following statements that are quoted from the questionnaire prove such wary: "a large number of teachers do not know how to do research", "I am not familiar with the correct procedure of research", "I don't know anything about research skills", "I don't know the right way of doing research because I haven't done anything after finishing university". Other participants mentioned that being incompetent in computer skills and English deterred them from access to resources.

In addition, items 4, 7, 9, 11, 12, 13, 15, 17, 18, 20, 22, 24, 26, 28, 30, 31, 33, 34 & 35 in the questionnaire sought information from teachers about their comprehension of research skills. In table 5 below, items 11 to 19, for example- Means between 3.75 and 4.12, indicating high agreement- prove

that participants lack very fundamental sense of research methodology such as the importance of research problem, interpretation of research results, referencing. The Means of positive statements i.e. 1 to 10, in addition to item number 20, indicate that there were some participants with reasonable understanding of research skills. This finding correlates with AlFarsi (2006) that lack of skills is a major obstacle to engagement of teachers in research.

Table 5: Statements and Means of respondents' research knowledge and skills.

No.	Statement	Mean
1	Literature review (electronic and paper-based) is important in research	4.43
2	Table of content helps readers spot the right information easily	4.38
3	Research reports have to be written in an accurate language and style	4.37
4	Research tools have to be administered in order to have results	4.29
5	Research questions are important	4.28
6	Tables, charts and illustrations help readers understand the research content	4.20
7	Selection of a sample is an important step in education research	4.13
8	I have a good idea about educational research	3.50
9	I can do educational research in the appropriate way	3.17
10	Research can be done before setting its objectives	1.96
11	It is not important to state a research problem when doing research	4.12
12	Results interpretation is not important for research	4.04
13	Referencing is not necessary for research	3.92
14	I can arrive to important results without data analysis	3.84
15	Testing of research validity and reliability is not important	3.79
16	Statistical analysis of data is not important	3.77
17	Recommendations are not important for research	3.75
18	Hypotheses are not necessary for research	3.60
19	Computer programs are not helpful for data analysis	3.56
20	I can do research without using any research tools	2.14

2. Work conditions, time constraints and logistics

Work conditions and time constraints are interlocked and both mentioned around 400 times in the open-ended part of the questionnaire and interviews. Item 32 in the questionnaire asserts that majority of participants did not have time for doing research, (Mean = 3.97) 'I am upset because I do not have enough time to do research'. Participants were overloaded with school work, their time was very tight in school and at home, so that they could not conduct research. A teacher asserted, "I am too much overloaded with teaching, assessment, out-of-class activities so that I can't do research or even think about doing it", another teacher mentioned that the teachers "are busy with teaching and other types of work... at home they have to go through other school duties in addition to their family and social responsibilities". Issues relating to logistics, mentioned more than 85 times, for example: deficiencies in resources, books, references, journals, computers, internet service, lack of financial support to cover expenses,

uncomfortable formal regulations and nonexistence of practical assistance in terms of, for example, distribution and collection of questionnaires. A teacher wrote, "references are very rare. I tried many times to do research; the most difficulty I faced was finding useful references".

This finding on the impact of work conditions and time on teachers' engagement in research agrees with AlFarsi (2006) and Reis-Jorge (2007) findings that heavy workload, class size and extracurricular demands reported as hindering factors that prevent teachers from practicing research.

3. Conceptual factors

Ideas under this category were mentioned both in the interviews and open-ended section of the questionnaire around 60 times. Factors mentioned under this category include participants' understanding of and attitudes towards research and its role in development of educational system, their understanding of society's perception of research and its consequences on teacher-research. Examples of quotes about implementation of TR results and recommendations at the Ministry levels are: "first obstacle is that researches done by teachers are left inside drawers and never used..."; "I have the desire yet there is no encouragement by the Ministry in terms of applying the results because those results might be against the policies". Actually, this problem is reported as an area of dissatisfaction by Borg (2013 p 198) who states that despite the publication of the reports of the research done by the candidates that he supervised the Ministry of Education- sponsor of the project- did not take any attempt "to consider what changes it might suggest to the ways the Ministry operates". Other quotes by respondents are "the society is unaware of the importance of research... people are uncooperative... when questionnaires are distributed, they never come back... when we conduct interviews we get incorrect results and so on"; "many people think that research is interfering in others' personal lives and confidentiality".

4. Institutional factors

Institutional factors relate to participants' perception of the role of peers, schools and the Ministry of Education in supporting or hindering teachers from practicing in research- an idea expressed around 150 times. A major component of this category (mentioned around 100 times in the questionnaire and by interviewees) is that participants thought that there was no clear system of encouragement/rewards implemented by the MoE for supporting teacher research. One of the interviewees said that "I cannot see practical plan implemented by the Ministry for encouraging teachers to do research".

Some more statements that respondents made in the open-ended question were: There is "no support provided by educational institutions"," any clear support and encouragement... I have no idea about awards or

promotions", "the surroundings, especially the school environment is not cooperative and not supportive", "school administrators do not encourage teacher research", and "the teacher is surrounded by many discouraging people".

Institutional support is crucial but unfortunately not provided by many school systems as previous research indicates. AlFarsi (2006) finds that lack of support by school is one of the major obstacles reported by the school teachers who participated in his study. Lytle and Cochran-Smith (1989 p 11) assert that "In many school systems, however, teachers have not been encouraged to work together on voluntary, self-initiated projects or speak out with authority about instructional, curricular and policy issues".

5. Participants' suggestions to engage in and with research

Both the interviewees and those who answered the open-ended part of the questionnaire suggested a number of ideas for more engagement in and with research. The suggestions are classified into three main categories below.

1. Training

Items 19 and 25 in the questionnaire focused on training and both gained high Means: item 19 (Mean = 3.91), 'I need training on research methodology' and item 25 (Mean = 4.15) 'I need a specialist to help and guide me when doing research'. Pre-service (undergraduate courses) and in-service training were mentioned by respondents more than 170 times in the open-ended part of the questionnaires and by all the 36 interviewed teachers as a main factor in helping teachers engage in research. One teacher stated "I suggest the establishment of in-service training courses on research methodology which is run by qualified specialists so that all teachers have a chance to attend". Many participants mentioned that they forgot the research skills that they studied at degree level so they need more training if they should do any research. Other suggestions include, teachers should be provided with a guidebook on how to conduct and write research in general, how to read and write internationally published research papers, and teachers' winning research papers should also be published and schools should be provided with copies of them so that teachers can refer to them as samples of well done research papers.

2. More systematic implementation of research results and rewarding approach

Participants suggested an implementation of a rewarding system that aims at establishing a research society where research becomes part of school life. This includes that "teacher research should be contextual-based and focus on real problems", "adaptation and adoption of well done research papers/projects and sound recommendations", and "rewards should be given to research practicing teachers". Ponte (2010 p 545) states that "teachers

work in a culture that respects their opinions and the knowledge that they bring to the research experience". Alfarsy (2006) thinks that lack of reward is one of the major obstacles to engagement of teachers in research.

3. Logistic support

Many participants suggested the establishment of a research department in each educational district aiming at providing researcher-teachers with professional support e.g. training, resources, guidance, distribution and collection of questionnaires and financial support. Schools should be provided with resources, PCs, internet service, and research material. Teachers should also have access to resource centres and libraries at Sultan Qaboos University and other research-based institutions. Other suggestions include "teachers should be given a chance to do research... the workload should be reduced a little bit, especially with non-pedagogical duties... it should be said that the teachers are more capable than anyone else to appreciate different types of educational problems".

Discussion

The study has attested that TR in Oman shares many of its trends and realities with TR as discussed in previous research e.g. Borg (2007 & 2013), Hannon (1998), Worrall (2004) Reis-Jorge (2007), Allright (1997), Nunan (1997) and Barker (2005) especially in terms of teachers' engagement in, and with, research, obstacles that hinder teachers from doing research and the support they need to become competent practitioners. For instance, the study's finding that only a small number of teachers in Oman practice research concurs with Borg's (2013, 6) assertion that "teacher research is a minority activity". The factors that hinder teachers from engagement with/in research, which are also highlighted in previous research such as Hannon (1998), Worrall (2004) and Barker (2005), include conceptual inaccessibility, work conditions, knowledge, skills, attitudes, lack of autonomy to implement research results and lack of time. They entail practical or logistic areas and teachers' conceptions and attitudes. The effect of such factors is not limited to teachers who do not engage in research, but also entails teachers actively engaged in research. Statements such as "I feel that my research is valueless because its results and recommendations are not considered seriously especially when contradicting with school regulations such as the length of the teaching day and curriculum", indicates that even researcher teachers might stop doing research under circumstances such as feeling that their research does not lead to change in the educational system. The statement also indicates that conflicts of interest between researcher teacher and school systems may prevent teachers from doing TR. The study maintains that teachers' conceptions, involvement, and attitudes towards practicing research varies in a way that influences their engagement and the

manner through which they benefit from research in classroom practice. It is obvious that some teachers are aware of the positive impact of TR on various areas of pedagogy, some feel unwilling to sustain their engagement in research, and others do not have the desire at all to be involved in practicing research.

Therefore, any endeavour to improve teachers' engagement with TR should address sustaining the engagement of researching teachers as well as encouraging less willing teachers to become effectively engaged in research. Such endeavour should also entail improving teachers' concepts, attitudes, and understandings as well as providing them with all logistical and practical conditions that help them become active and competent researchers. For example, in terms of attitudes and concepts, it should be clear to the teachers that if they want their research outcomes to be considered for implementation they should follow Nunan (1992 &1997), Murray (1992) and Myers' (1987) view that TR is an approximation of university-based academic research that is taught in under/post graduate research skills courses and implemented by academics. Teachers, therefore, should be grounded in basic and applied science research in order to be competent to fulfill criteria set for teacher-research within this realm (Nunan, 1997; Myers, 1987 and Reis-Jorge, 2007). For those teachers who claim that they do not have the skills and work conditions that support practicing academic type of TR why not consider performing TR as exploratory practice Allwright (1997), Bissex & Bullock (1987), Mohr & Mclean (1987), Richardson (1994) and Cochran-Smith & Lytle (1990). Teachers should be aware that exploratory practice is a pedagogy-oriented, research-like approach that helps maintain sustainability in teacher-research, though quality does not support change beyond teacher's limits (Allwright, 1997).

Participants' comments on the difficulties they encounter when conducting TR and the solutions they suggested overcoming them indicate that institutional support should be provided at three interconnected circles i.e. schools, educational districts and the Ministry. Participants explained that "the school culture is not supportive of teacher-research", reasons included "school management does not encourage teachers to do research", "shortage of time because of workloads", "discouraging peers", "lack of references, books and previous research", etc. Such statements demonstrate school support is at the core of the institutional support that teacher researchers need. Sustained and productive teacher engagement in research requires institutional commitment and a research culture that acknowledge all support structures (Barker, 2005 and Borg, 2007). Support at educational district and the Ministry level is required because it should help "towards a positive attitude and increased likelihood of participation in the innovation on the part of teachers" (Kennedy, 1987, p 165). In addition, the Ministry should

establish a mechanism to facilitate and supervise the realization of TR results and the possible implementation of its recommendations. To summarize, educational districts and the Ministry should encourage schools to become active research centers by setting up policies, strategic planning and providing financial assistance.

Conclusion

Making TR a common, rather than a minority activity requires addressing all the factors that prevent teachers from engagement in research. Teachers' belief that TR does not lead to consequent change in the educational system requires further investigation to identify what indicates to teachers that their research is sound and trustworthy. Further research should also investigate what factors affect decision making in order to consider or not consider TR results and recommendations for change. The institutional support for TR from an institutional point of view is another potential research area, given the contextual application of this study.

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EVALUATING THE COMMAND CLIMATE IN MILITARY UNITS

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Abstract

Military units are principally concerned with training and preparing for operations when they are not deployed on missions. During these periods when they are predominantly stationed in barracks, they are also occupied with a host of administrative and domestic tasks assigned by their higher formation. Despite the varied nature of day-to-day activities, heads of these units or commanders have the challenge of ensuring a suitable organisational climate (referred to as command climate) as this would inevitably contribute towards operational effectiveness.Unlike organisational climate, command climate is impacted by variables peculiar to military units. Existing literature indicates various psychological dimensions of operational effectiveness that includesmorale, group cohesion, confidence in leadership and job satisfaction. These variables have to be further verified through a systematic process i.e. scouring existing literature and conducting in-depth interviews with experienced commanders. Underlying theories impacting the various constructs will be identified to provide the necessary grounding. Subsequently,these intangible factors will be empirically measured. This research has its main objective of developing and validating a reliable and easy to use measurement tool, which would eventually enable military unit commanders to evaluate command climate as and when required.Higher formations will also be able to determine the ability of units to perform in the event they are deployed to undertake missions under stressful conditions.

Keywords : Organisational climate, command climate, morale, cohesion, job satisfaction.

Introduction

One of the major tasks during peacetime for defence organisations is to prepare for military operations. These operations may be in the form of routine assistance to civilian authority within the country or the more demanding task of defending the nation's territorial integrity during times of

crisis and war. More frequently than ever, military forces are also required to operate abroad with coalition partners in peacekeeping and humanitarian relief operations. Military commanders thus have the task of ensuring that the organisations they command can perform effectively when called to undertake a wide range of missions.

To enhance organisational effectiveness, modern military forces are embracing greater levels of technology to improve their fighting and operational capability. However, commanders cannot depend on technology alone to produce a capable fighting force. Recent researches in militaries across the globe concur with evidence continually gleaned from business and industry that success is highly dependent on the quality of human workforce and their motivation (Murphy & Fogarty, 2010). Thus, a military organisation's effectiveness in accomplishing military operations is very much dependent on how its personnel (men and women) are trained, gelled together and motivated. This in turn is reliant on a positive organisational culture and climate. More than ever before, organizational (command) climate has become an increasingly significant prerequisite for unit effectiveness and combat readiness (Jones, 2003).

This paper has its main objective to discuss the concept of command climate in military organisations. It will be limited to army units and not discuss the challenges for climates in other defence and security agencies.This paper endeavours to determinetwo aspects; 1) The dimensions of military command climate, and 2) The development of a measurement instrument.

Scope

This research will initially be carried out within the Malaysian Army infantry units only. Command climates within these units are unique.The major thrust of the research will be to design a measurement tool to evaluate command climate during peacetime and barrack duties. The instrument developed through this research will only be able to measure command climate infull-deployment or combat missionswith further modification.

Existing Climate Surveys

Command climate surveys have become a routine and important activity for many modern defence forces. Though they may take different forms, their fundamental objective is the same i.e. to measure the possible readiness and eventual effectiveness of combat units, in particular, to undertake military operations. The US Army requirescommanders to carry out a Command Climate Survey to evaluate their unit's work environment upon assuming command. This survey is to be repeated from time to time as required by policy(US Army Headquarters, 2008). It is a 24-item instrument

which measures responses in various scales. There is also a separate section that requests for qualitative data. The UK Ministry of Defence uses the Armed Forces Continuous Attitude Survey (AFCAS) designed to collect information on attitudes and opinions of serving military personnel. However each service of the armed forces is given a slightly separate format which is able to tap individual responses based on varied roles and experience. It is essential done online with 100 items measured in various scales.

More detailed information is available of a unit climate survey used by the Australia Defence Forces since 2004.Known as the Profile of Unit Leadership, Satisfaction and Effectiveness (PULSE) survey, it provides a snapshot on the status of morale of unit and sub-units. It is intended to inform commanders on the motivational levels of their personnel and factors that influence this outcome (Goyne, 2010).The PULSE delineates response at the tri-level of individual, group and unit. The core constructs measured are job stress, work motivation, job satisfaction, satisfaction with communication, confidence in leadership, teamwork or cohesion, organisational support and organisational commitment. Thus far the PULSE survey is well received by commanding officers in the Australian Defence Force and unit members are happy to respond to subsequent surveys when they realize their feedback through this survey are acted upon.

It can be concluded from the overall analysis of existing surveys that each military force employs instruments that are best suited to their respective needs. Further to that, not much information can be gleaned from the essential constructs that need to be measured and corresponding data analysis method. Due to this, it would be best to refer to other forms of literature to design an initial framework for the purpose of developing a purpose-designed scale.

Key Concepts of Command Climate

In this section, definitions of the various concepts and constructs will be framed and subsequently preliminary thoughts on their interrelationships will be outlined.Concepts related to organisational climate should provide a useful reference for the measure of command climate, as they are both the same constructs but operationalised in different environments.

Climate

Climate is a complex construct. Many studies tend to describe organisational climate and culture as one concept or culture being a sub-set of climate (Rosseau, 2011).However, Schneider (1985) suggests that climate denotes activities and processes while culture relates to the shared norms and values. Similarly, Watkin and Hubbard (2003) propose that organisational climate is "a measure of employees' perception of those aspects of their

environment that directly impact how well they can do their jobs''. Another, more elaborate, definition of organisational climate is offered by Bowen and Ostroff (2004). They define organizational climate as shared perceptionsamong employees of what the organization is like in terms of practices, policies, procedures, routines, and rewards. In the military the commander of a unit, by virtue of authority given to him, is solely responsible for the climate of his organisation (Doty & Gelineau, 2008). A positive command climate is essential to building a disciplined, efficient, well-run unit capable of accomplishing assigned tasks. This must be done in concert with establishing a disciplined process by which effective communication throughout the chain of command can occur (Edson, 2011). In the context of this research, army infantry units are known to possess the same basic organisational culture. Despite this fundamental similarity, the productivity and eventual effectiveness of each unit can differ vastly. Academic literature attributes this to individual and collective motivation influenced fundamentally by command (organisational) climate created largely by the commanders and senior members of the unit.

Morale and Motivation
        Morale and motivation are two peculiar concepts. Both morale and motivation can be a measure of command climate as well as an outcome of positive climate. Britt and Dickinson (2005) state that morale in the military is indicative of a service member's level of motivation and enthusiasm for accomplishing a mission. Similarly, shared perceptions of undesirable organisational state of affairs,can contribute to low moraleand hence low motivation to work.However, when the overall climate creates a conducive and vibrant working environment, morale and motivation can be high. Manning (1991), argues that morale has sharply different meanings depending on thecontext. The US Army manual on Leadership (2006) provides a clearer illustration of military morale:
        "*Morale is the human dimension's most important intangible element. It is a measure of how people feel about themselves, their team, and their leaders. High morale comes from good leadership, shared effort, and mutual respect*".
        This definition suggests that morale in not only an individual feeling but reflective of the entire team or group feel about themselves that eventually creates the motivation and enthusiasm to perform their tasks. When group members feel respected and perceive their commanders to be doing a good job, morale and motivation can be expected be high.

Cohesion

In evaluating unit climate, the Australian PULSE model taps the perception of both task and group or social cohesion (Goyne, 2009). Task cohesion is defined as:

"…the shared commitment among members to achieving a goal thatrequires the collective efforts of the group. A group with high task cohesion is composed of members who share a common goal and who are motivated to coordinate their efforts as a team to achieve that goal". On the other hand, social cohesion is the extent to which group members like each other, prefer to spend their social time together, enjoy each other's company, and feel emotionally close to one another"(MacCoun and Hix, Undated).

It would be best if a group can have both task and social cohesion. An indicator of this is when group members spend a lot of time working, playing, training and participating in leisure activities together. The military in general (and the infantry in particular) has a deliberately powerful socialisation system. These socialising influences and develops group cohesion and highly motivated teams for necessary for group survival and successful missions (Pinch, 2006).

Confidence in leadership

In the military, the Commanding Officer as the CEO of a unit has the authority and responsibility for establishing the leadership climate and developing disciplined and cohesive units (US Army Headquarters, 2008). Literature is abound with studies that link leadership and participative management with employee satisfaction. Many studies report of employees pointing tonon-supportive group and leader relations as causes of stressful organisational climates. (Rosseau, 2011; Schneider, 1985).A study undertaken at the US Naval Academy (Miller, 2006) suggests that leadership characteristics that are centered on equality and fairness have significant influence on a unit's morale and hence job performance. Similarly, Jones (2003) stressed the importance of leader trustworthiness as major contributor of command climate. As leadership is all about change and getting theorganisation from "here to there", people would rather follow a commander who they have confidence in leading them especially where there is great risk to life and limb.

Job Satisfaction

Any research that studies employee perception of their work place can be considered as a climate study. Most widely studied are the relationship of climate to employee well-being such as job satisfaction and job stress (Rosseau, 2011).   Job satisfaction is the combination of feelings

and beliefs that workers hold in relation to their current jobs. Someone with a high level of satisfaction will generally like their job. They feel that they are being fairly treated and believe that the job has many desirable facets. The satisfaction at work has been characterized as a positive or pleasing emotional state that emerges as the result of evaluating one's work or experiences in the workplace. (Locke, 1976). Job satisfaction is the degree to which people like their jobs. Some people enjoy work and find it to be a central part of life. Others hate to work and do so only because they must. The study of the causes and consequences of these important issues is one of the major domains of organizational psychology. Job satisfaction is directly related to job performance, attitude, motivation and morale. Job dissatisfaction was predicted by lack of career opportunities, poor organizational climate and morale and lack of autonomy at work, together with some domestic stressors e.g. family health" (Cooper & Sloan, 1985).

Job Performance

Job performance can be defined as how well a worker executes job related tasks and activities (Schneider, 1985). As in all other spheres of the work environment, the military carries out annual evaluation of personnel as a way of monitoring job performance. The Australian PULSE model places job performance as an importance outcome unit climate (Goyne, 2010). However, personnel responding to the PULSE survey are required to do self-appraisal of how well they are performing their job. This is in conflict with what is generally known in social science research as rater-bias. Sekaran and Bougie (2010) suggest that rater reliability is an important issue which should be addressed through more objective and precise criteria of measurement. Job performance can also be based on annual evaluation reports made by superiors. There is a need to weigh these two options.

Conceptualising the Measurement of Command Climate

Each of the concepts defined in the preceding paragraphs has the potential to predict job performance as an outcome. Based on the definitions and relationships established thus far, an initial conceptual model to aid the research is proposed as follows:
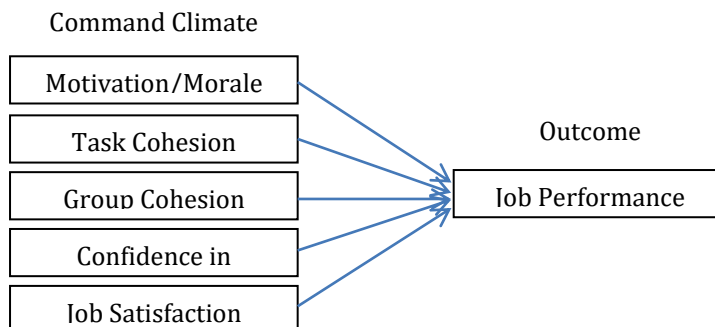

Figure 1: Conceptual Model for Measurement of Command

Research Method

To undertake this research, prior permission will have to be requested from Army Headquarters (Human Resource Branch). Their agreement and support is essential to the cooperation from commanding officers of targeted military units and respondents. As this is an exploratory study, the instrument will have to be designed taking into consideration the peculiarities of the Malaysian Army. Patton's (2002) suggestion that a triangulation method be used to check and establish validity of findings from multiple perspectives will be adhered. This is in an endeavour to overcome the weaknesses and biases from using a single method, single-observer and single-theory studies.

Towards this end, four distinct steps shall be followed in designing and constructing the survey questionnaire to meet scientific rigour and standards. First, based on the conceptualisation of command climate gleaned from relevant literature, each sub-domain will be operationalised. Care will be taken to ensure each construct can be measured. Where possible the existing questionnaires from past related studies will be sourced. Secondly, requirement, a focus group discussion shall be arranged at the Army Headquarters to obtain inputs on the concepts of command climate and its operationalization. The theoretical model will be presented to experts ensure face validity. This will inevitably involve senior officers who have experienced peacetime and operational command. Thirdly, interviews and discussions will be carried out with senior rank and file personnel currently serving in infantry units. They are the people who experience command climate first hand. Their views on positive and negative contributors of command climate will be solicited. Collectivelythis information from literature, focused group discussions and interviews will be triangulated in designing the required survey instrument. Finally, to ensure high content validity, an army psychiatrist and expert on test construction will be sought to help verify each item of the instrument. Factors such as respondents military experience (numbers of years of service), language proficiency and understanding of the various terminologies are important criteria in the overall design of the test.

Research Ethics

To obtain genuine feedback and participation, respondents must be given the assurance that they can provide honest and direct but anonymous feedback to their commander. Thus, it is important to ensure the highest standards of confidentiality in this research especially as it requires respondents to share information about the impact of their superior's performance within the organisation. Responses shall be treated with the strictest of confidence with assurance that no one accept the researchers will

see the completed survey. Completed surveys must be safely stored and destroyed appropriately within an agreed time.

Conclusion

Many western defence forces have been using some form of survey to quantify command climate to seek greater assurance of operational effectiveness. Indeed the report generated by this survey will be helpful to unit commanders to determine the different actions to be taken to improve the climate within their units. It will also help higher commanders to ascertain the potential readiness of a given unit under their command. This is an exploratory study and a first of its kind in the Malaysian Army. It is hoped that this can be a pivotal study for further research on command climate in the Malaysian military environment. The empirical evidence collected from the study shall be able to provide a foundation for the development of a robust instrument for evaluating the command climate of infantry units in Malaysian Army.

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