Relationship between students' perception of learning environment, learning styles and achievement in an internet-based TEFL methodology course

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Abstract

This is a case study exploring the relationship between achievement in a Teaching English as a Foreign Language (TEFL) course, students' perceptions of their e-learning environment, and their learning styles. The researcher manipulated a descriptive method using appropriate correlation coefficients to explore this relationship. The subjects were 25 female students who were taking a Web-based course in TEFL Methodology offered as part of a graduate program at the Faculty of Education at Beni Suef. Findings revealed a statistically positive correlation between achievement in the TEFL Methodology, perceptions of the digital learning environment, and the learning styles of the subjects. This relationship becomes greater in the case of the preferred learning environment (i.e., students' perceptions of an ideal learning environment). The paper concludes with suggestions for further research based on the findings of this study.

Introduction and Background

The literature is abundant with optimistic calls for the incorporation of web-based delivery media into our teaching/learning environments due

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to which the practice of using technology to deliver coursework in higher education 'has seen a veritable explosion' (Wegner et al., 1999). The assumption is that web-based learning is conducive to the advancement of learning and teaching strategies (Willis & Mehlinger, 1996; Wallace & Mutooni, 1997; Usip & Bee, 1998; Schulman & Sims, 1999; Shih et al., 1998; Serwatka, 2003, to cite just a few). The use of Internet technology has not only created new opportunities within the traditional classroom, but has also served to expand learning experiences beyond the popular notion of "classroom" into an interesting, attractive and interactive media for learning and/or teaching (Wegner, et al., 1999; Serwatka, 2003). However promising the medium is the empirical testimony that evidences the potentiality of using this medium in enhancing instruction and learning, and consequently achievement is scarce in the Egyptian context and may perhaps be nonexistent in our Arabic-speaking community who are learning English as a foreign language (Mekheimer, 2005). On the other hand, if it is the case, as Clark (1983, p. 445) noted, that "media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in nutrition", we cannot gullibly take this for granted; building on the same argument as Clark's: the truck that delivers groceries may still cause changes in nutrition given that it brings food faster and fresher that may help in nutrition; and so too the Internet may improve learning if it matches the learning styles and learning patterns of the students.

Mekheimer (2005) reviewed studies and project evaluations conducted on e-learning and concluded that Internet-based learning could be an effective educational intervention and resource depending on how effectively it was used and the contexts it was used under. Others have found that studies often considered technology *in* and *of* itself as an educational intervention and disregarded how and when it was used (Becker & Dwyer, 1998). The evaluation criteria include the instructional setting (or the learning environment), teacher training and how the teacher integrates technology into instruction (Tan & Hung, 2002). Educational literature further suggests that learners who are actively involved in their learning in an environment which is liable to induce learning are more apt to achieve academic success (Dewar, 1996; Hartman, 1995; Coalition for Leadership Project, 1995).

Once students' involvement in a pro-learning environment is induced, a propensity for self-directed learning can produce increased achievement. The notion of a 'learning environment' or a 'classroom environment' – terms associated with what is called 'learning climate' – first appeared in the literature in Lewin's writings when he recognised a significant relationship between learning environment and students' interactions in this environment, suggesting that the learning environment is one of the strongest determiners of classroom behavior and academic success (Lewin, 1936). Since then, research has been conducted worldwide in terms of how perceptions on the learning environment influence learning (Fraser, 1994, 1998; Fraser & Walberg, 1991). Classroom research is increasingly focused on learning environments, especially in constructivist learning classrooms and Internet-based environments (Taylor, Fraser, & Fisher, 1997; Fraser & Aldridge, 1998). Some of this research was aimed to identify the relationship between perceived learning environments and learning-related variables such as achievement and learning styles; but most of this research was done in Western cultures (Fraser, 1998; Fraser & Walberg, 1991; Wubbels & Levy, 1993).

However, most of these studies investigated the effects of traditional learning environments or web-based learning environments compared to traditional learning environments instead of exploring case studies of e-learning situations that can provide vivid descriptions of the usefulness of the Internet-based learning medium; this can help in exploring attitudinal, motivational and achievement developments intrapersonally, which can be more reliable.

Further, Arabic classroom research is nearly void of research that taps into the relationships of perceived learning environments to students' achievement (Ahmed, 1998; Rawashda, 1997). Therefore, there is a need to study the relationship between students' perceptions of a web-based learning environment and achievement in an Arabic classroom. Furthermore, teacher training can be improved by effectively adopting virtual education and e-learning networks in a context that supports or is supported by Internet connectivity – that is, an e-learning environment.

Learning environments involve elements and determiners of academic success, especially when it matches the students' learning styles, the teacher's teaching style, and when it empowers students' autonomous

and self-directed learning (Dewar, 1996; Hartman, 1995). Research has also indicated that creating classroom environments that match students' perceptions of preferred learning conditions, living up to their learning preferences, and appropriating their individual variations may well lead to more enhanced learning outcomes and achievement (Agogino & Hsi 1995; Kramer-Koehler et al., 1995). Walker (2004), who provided a thorough review of the evolution of psycho-social environment research and learning environment instruments, building on cognitive, social and affective constructs, found that psychosocial characteristics in classrooms provide valid predictors of student outcomes.

In contrast, there is research that indicates that learning styles vary widely in web-based environments. Understanding these variations in learning styles may help to improve learning environments (Hartman, 1995). Nonetheless, there has been some research (Parson, 1998; Alexander, 1995) which raised arguments as to the possibility that Internet-based learning environments may not be appropriate to the learning styles of some students, or may not be efficient enough to engender preferable modifications in learning styles (Mekheimer, 2005); thus, it is necessary that when implementing a new technology, instructors incorporate evaluation methods appropriate to the new media. Several researchers (Kollock & Smith, 1999; Howland & Moore, 2002; Mekheimer, 2005) reported preferences for an online learning environment that matched subjects' learning styles, but many asserted that the online line learning environment was not effective in changing or moderating learning styles, hence the need to grasp how new Internet technology can affect learning when it is used by different types of learners who have different learning strategies, and different learning styles.

Most previous research has noted that it is crucial that educators address issues related to the realization of technology's potential to influence teaching and learning. It is because researchers in the psychology of education and their partners in pedagogy have long supported the notion that individual differences play an important role in learning and instruction. There is consensus that learners 'filter instruction through a set of individual lenses' (Jonassen & Grabowski, 1993) and perceive information in different ways, and achieve understanding at different rates and in various learning contexts (Barbe & Milone, 1981; Corno & Snow,

1986; Felder, 1993; Felder & Silverman, 1988). Experimental studies have also confirmed that students' styles of learning and thinking make a difference to their academic achievement (e.g., Kim & Michael, 1995; Saracho, 1993).

Therefore, recognizing learning styles may help educators understand how people perceive and process information in different ways. A review of research on learning styles suggests that the findings of previous research cannot yet be considered as conclusive (Mekheimer, 2005). Moreover, a number of studies that have attempted to explore the differences in learning style preferences and learning success between students enrolled in an online course and students in a traditional face-to-face course, may be discounted due to the great dissimilarity between the two learning environments and in some cases due to the short time taken in such experiments (Mekheimer, 2005).

The present study, therefore, aims to explore relationships between students' perceptions of an Internet-based learning environment, learning styles and achievement in a TEFL course delivered in a digital lab. The problem is defined by the following research questions:

1. Is there a relationship between achievement in a TEFL graduate course delivered in an online learning environment and the students' perceptions of this environment?

2. Is there a relationship between students' learning styles and achievement in the TEFL course?

Methodology

Participants

The sample consisted of 25 female (aged between 23-36) students randomly selected from the graduate students in the General Diploma Programme in the Faculty of Education at Beni Suef in the first term of the academic year 2005. Students enrolled in this programme are either pre-service teachers or in-service teachers, but all received no pre-service training. In the Egyptian context, the Ministry of Education as well as national and international agencies concerned with the professional development of teachers organize training programmes and workshops for

teachers to acquire basic computer skills. Therefore, the subjects had basic computer and Internet skills that helped them handle the online course.

Apparatus

The Students' Perceptions of Learning Environments Scale (SPLES)

Developed by Abul-Saud Mohamed Ahmed (1998), the scale consists of 40 items in two forms, A and B. The A Form aims to assess classroom educational practices in the TEFL course digital environment, whilst the B Form describes the preferred, ideal classroom practices as defined by subjects of the study. All items of the SPLES were worded in statements on a 5-Likert Scale scorable $(5, 4, 3, 2, 1)$ for positive responses that match the responses on the scale (Always, Often, Sometimes, Rarely, Never at all) respectively, and scorable $(1, 2, 3, 4, 5)$ for negative item responses respectively. The SPLES consists of three dimensions:

1. Relationship (this dimension consists of two subscales: Involvement (5 items) and Student Cohesiveness (5 items).

2. Personal Development (this dimension consists of three subscales: Open-ended activities (5 items), Investigation (5 items), and Integration (5 items)

3. System Maintenance and Order (this dimension consists of three subscales (Rule Clarity (5 items), Physical Environment (5 items), Differentiation (5 items).

Psychometric Characteristics of SPLES

Validity:
Concurrent validity of the SPLES was calculated by the SPLES developer by correlating forms A and B where the correlation value reached 0.68 significant at 0.01. Piloting the SPLES for validation on a sample of 30 students enrolled in the Special Diploma programme, a concurrent validity was also calculated, and a correlation coefficient was 0.65 significant at 0.01

Reliability:

In statistical analyses, the internal consistency (Cronbach alpha reliability) and discriminant validity (mean correlation of a scale with the other six scales of the instrument) were used. The Cronbach alpha reliability values of the two forms of the SPLES and its subscales ranged between 0.43 to 0.71. The results are reported in Table (1):

Table 1. The Cronbach Alpha Reliability Values of SPLES (in the Pilot Study framing the present research) (Forms A & B)

Dimensions	Sub-scales	Reliability values for Form A	Reliability values for Form B
Relationship dimensions	Involvement	0.66	0.69
	Students' Cohesiveness	0.69	0.72
Personal Development Dimensions	Open-ended	0.75	0.76
	Investigation	0.77	0.78
	Integration	0.79	0.80
System Maintenance and Order	Rule Clarity	0.80	0.81
	Physical	0.79	0.80
	Environment Differentiation	0.82	0.83

The Learning Styles Inventory by Rawashda (1997)

This inventory consists of 77 items distributed across 10 dimensions: attitude, motivation, timing, anxiety, information processing, selecting basic ideas, learning aides, self-testing and testing strategies. All items were statements in a 5-Likert scale, scorable (5, 4, 3, 2, 1) for positive responses respectively for (Too much, Much, Moderately, Rarely, and Too rarely), and scorable (1, 2, 3, 4, 5) respectively for negative responses on the same scales.

Psychometric Characteristics of the Learning Styles Inventory

Validity:

Validity was calculated for the LSI by the scale developer by correlating every item to its respective dimension's score; all correlation coefficient values were significantly positive, where the values between each item and its respective dimension ranged between 0.59 and 0.72, and the values between each item and the total score of the LSI correlated between 0.67 and 0.89, all values significant at 0.01.

Reliability:

The LSI by Rawashda (1997) was assessed for reliability by the Test-Retest method where correlations between the two administrations for all dimensions and the total score ranged between 0.65 and 0.85. The Cronbach alpha reliability revealed a reliability coefficient ranging between 0.49 and 0.77. In a pilot study, Cronbach alpha reliability was calculated and the reliability was assessed at ranging between 0.66 and 0.82.

The Achievement Test

The Achievement Test is a multiple choice test, developed in the format of paper and pencil for all experimental and control subjects, covering the main curriculum topics. The test was reliable at 0. 81 (Cronbach Alpha) and was validated by a jury of TEFL methodologists.

Design

The study used correlational methods. The design involved obtaining three scores for each participant, one score for each variable, i.e., learning environment perception scale scores, learning styles scale scores and achievement test scores, eventually the paired scores are then correlated. The resulting correlation coefficients indicated the degree of relationship between the three variables.

Hypotheses

It was hypothesized that:
    1. There is a significantly positive correlation between achievement

in the TEFL course and the students' perceptions of the digital learning environment;

2. There is a significantly positive correlation between achievement in the TEFL course and the students' learning styles.

3. Achievement can be predicted from recognising the learning styles of students, the real classroom environment, and the ideal classroom environment.

Procedures

In this relationship study, the researcher identified the variables, i.e., learning environment perception and learning styles, potentially related to the complex variable under investigation, i.e., achievement. The students were instructed in a TEFL Methodology course for three months in a language lab, an Internet-based digital lab, where they were given an overview of the course which involved the following topics: What is language? What are the purposes of teaching and learning foreign languages, the hierarchical taxonomy of approach, method and technique, a survey of the common teaching methods in TEFL (Grammar-Translation Method, Direct Method, Audiolingualism, Communicative Language Teaching Approach, Situational Language Method, the Silent Way, Suggestopaedia), and assessment and evaluation in TEFL. Subjects were assigned to five e-learning groups based on their preferences, with each group consisting of a spokeswoman, a secretary, two participants and a group leader .The students were asked to log onto the Web and collaboratively work on these topics based on task sheets with learning objectives and activities that they were given in each lab session to complete their e-portfolios. The instructor (the researcher), using NetSupport software[1] managed the learning of the students and functioned as a facilitator to guide their web-based learning. However, at the end of sessions, a PowerPoint presentation was conducted to summarise the main learning

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[1] NetSupport is a programme that combines powerful PC remote control with advanced desktop management functionality. For more detail refer to:
http://www.pcs.uk.com/nsm/netsupport_manager_overview.htm

topics covered. At the end of the term, students completed an achievement test, the Learning Styles Inventory by Rawashda (1997) and the Students' Perceptions of Learning Environments Scale by Abul-Saud Mohamed Ahmed (1998), and the scores for each variable were correlated with the scores for achievement.

Results

To test the first hypothesis indicating that there is a significantly positive correlation between achievement in the TEFL course and students' perceptions of the digital learning environment, the *Pearson Product Moment Correlation Coefficient* was used to correlate the students' mean scores in the achievement test and the SPLES. Table (2) reports the correlation values (N = 25):

Table 2. Pearson Product Moment Correlation Coefficient values between Achievement levels and Perceptions of the E-learning Environment

Dimensions	Sub-scales	Real Classroom Environment $P \geq 0.396$ significant at 0.05	Ideal Classroom Environment $p \geq 0.505$ significant at 0.01
Relationship dimensions	Involvement	0.56	0.77
	Students' Cohesiveness	0.59	0.73
Personal Development Dimensions	Open-ended	0.58	0.79
	Investigation	0.55	0.80
	Integration	0.60	0.82
System Maintenance and Order	Rule Clarity	0.62	0.75
	Physical Environment	0.66	0.76
	Differentiation	0.60	0.79

The above table demonstrates that there is a significantly positive correlation between achievement in the TEFL course achievement means

scores of the students and their perceptions of the real and ideal learning environments; it is worth noting that this correlation is of greater value in the case of the preferred, ideal learning environment as perceived by the subjects of the study. To test the second hypothesis indicating that there is a significantly positive correlation between achievement in the TEFL course and the students' learning styles, the Pearson Product Moment Correlation Coefficient was used to correlate the students' mean scores in the achievement test and the LSI. Table (3) reports the correlation values ($N = 25$):

Table 3. Pearson Product Moment Correlation Coefficient values between Achievement and the Students' learning Styles

Dimension	Correlation Coefficient $p \geq 0.396$ significant at 0.05	Dimension	Correlation Coefficient $p \geq 0.505$ significant at 0.01
Attitude	0.66	Information Processing	0.60
Motivation	0.64	Selecting of Basic Ideas	0.49
Timing	0.59	Learning Aides	0.49
Anxiety	-0.50	Self-testing	0.60
Concentration	0.67	Testing strategies	0.61

The above table shows that there is a significantly positive correlation between achievement in the TEFL course achievement as determined by mean scores of the students on the achievement test and their learning styles on all dimensions except for the Anxiety Dimension where there was a negative correlation between this dimension and the students' achievement.

To test the third hypothesis of the study stating that academic achievement can be predicted by recognising students' learning styles, the real classroom environment and the preferred ideal classroom environment, a stepwise multiple regression analysis was conducted. Table (4) summarises the findings:

Table 4. Stepwise Multiple Linear Analysis for Independent Variables (Classroom Environment and Learning Styles) and Dependent Variable (Academic achievement)

Step No	Independent variables by order	Correlation Coefficient (R) (R²)	Coefficient of Multiple Determination (b)	The regression coefficient	t-value	Sig. Level
Step No 1	Preferred Classroom Environment	0.73	0.53	13.848	4.945	0.01
Step No 2	Real Classroom Environment	0.70	0.49	11.804	4.828	0.01
Step No 3	Concentration	0.67	0.45	10.335	4.770	0.01
Step No 4	Attitude	0.66	0.44	9.557	3.170	0.01

The above table shows that the following variables are good predictors of academic achievement for the subjects of the study; these are from the bottom-up as follows:

1. The preferred classroom environment, where correlation coefficient (R) reached 0.73, coefficient of multiple regression (R²) reached 0.49, and t-value reached 4.828 significant at 0.01.

2. The real classroom environment, where correlation coefficient (R) reached 0.70, coefficient of multiple regression (R²) reached 0.49, and t-value reached 4.828 significant at 0.01.

3. Concentration, where correlation coefficient (R) reached 0.67, coefficient of multiple regression (R²) reached 0.45, and t-value reached 4.77 significant at 0.01.

4. Attitude, where correlation coefficient (R) reached 0.66, coefficient of multiple regression (R²) reached 0.44, and t-value reached 3.170 significant at 0.05.

Other variables (such as motivation, timing, anxiety) are not powerful predictors of academic achievement, such as concentration and attitude. Deriving a constant of regression equal to 122.487, the following regression equation can be extrapolated for predicting academic achievement in the students as follows:

Academic achievement = 122.487 + 13.848 the ideal classroom environment + 11.804 the real classroom environment + 10.335 Concentration + 9.557 Attitude

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Discussion

This study investigated the nature of an online classroom environment – a digital online lab where a TEFL course was delivered to graduate students in the Faculty of Education at Beni Suef. The researcher manipulated the SPLES developed by Ahmed (1998) and the LSI developed by Rawashda (1997) as appropriate scales for assessing students' perceptions of learning environments and their learning styles respectively. The Pearson Product Moment Correlation Coefficient was used to explore the relationships between variables of the study. Findings revealed that there was a positive, significant correlation between achievement and the students' perceptions of the real and ideal e-learning environment on all dimensions, suggesting that the correlation values became greater in the case of the ideally perceived learning environment. This finding is commensurate with previous findings indicating a relationship between achievement and perceived learning environments (Moos, 1996; Teh, 1999; Picket & Fraser, 2002). This is explicable by the fact that a preferred digital e-learning environment favourable to the students means more motivation and more positive attitudes to learning, enhanced classroom interaction and fostered personal development informally indicated in the instructor-students interactions, an observation consistent with existent literature. Available literature indicates that positive perceptions of a learning environment predicts academic achievement and enhanced learning outcomes, including motivational and attitudinal factors as well as skill (Fraser & Walberg, 1991; Wubbels & Levy, 1993; Khine & Fisher, 2001; Riah & Fraser, 1998; Wong & Fraser, 1996). Other research

(Daniel, 1999) indicates a significant main effect and interaction effects between learning styles and learning environments that support the notion that faculty development programs should be designed to increase awareness of learning style differences and equip faculty to meet the diverse learning needs of the students.

Findings also revealed a significantly positive relationship between achievement and learning styles on the LSI dimensions except for the Anxiety Dimension. This indicates that learning styles appropriately geared towards learning may help in enhancing achievement; this finding is compatible with previous research that correlated learning styles and learning environment perceptions (Letteri, 1982; Kolb, 1984), and especially in non-traditional learning environments such as computer-aided and Internet-based learning environments (Daniel, 1999). Anxiety was recognised in the literature as inhibitive to academic success (Wigfield & Eccles, 1989). In this study, it was negatively correlated to achievement, supporting previous research (Jegede & Kirkwood, 1994).

Suggestions for further research

The present study bore evidence to an existing relationship between perceptions of the learning environment and achievement and between learning styles and academic successful performance in e-learning environments. This finding needs further investigation of the relationship between learning styles and the instructional design in an e-learning environment in college courses, including investigating field-dependence versus field independence learning styles and perceptions of e-learning environments as related to achievement in the various college subjects.

As well, it is suggested that we, Egyptian educators, need to develop an e-learning environment scale such as SPLES specially designed to recognise the efficiency of the e-learning environments. By the same token, there is a need to develop learning styles inventories appropriate to e-learning environments in the Egyptian context.

Further, there is a need to explore the relationships between anxiety levels and success factors in online learning environments.

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