THE EFFECT OF COMPUTER-MEDIATED INSTRUCTION AND WEBQUEST ON PRE-SERVICE BUSINESS EDUCATION TEACHERS' SELF-DIRECTED LEARNING READINESS AND TEACHING PERFORMANCE

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Abstract

Problem: *Egyptian business education programs still adopt traditional ways that do not incorporate new educational technology and Web applications into teaching. This study investigates the effect of using computer-mediated instruction and WebQuest on pre-service business education teachers' self-directed learning readiness and teaching performance.* ***Research Questions:*** *What is the effect of using computer-mediated instruction and WebQuest on pre-service business education teachers' self-directed learning readiness? What is the effect of using computer-mediated instruction and WebQuest on pre-service business education teachers' teaching performance? What is the effect of pre-service business education teachers' self-directed learning readiness on teaching performance?*

Research Method: *True experimental with randomized subject pre-test and post-test control group design.* ***Data Collection Procedures:*** *Two instruments were applied: self-directed learning readiness scale and teaching performance observation checklist.* ***Results:*** *There is a significant difference between the experimental and the control group on self-directed learning readiness and teaching performance. This difference was in favor of the experimental group.* ***Conclusions and Recommendations:*** *Using computer-mediated instruction and WebQuest became a needed approach to improve pre-service business education teacher's' performance and quality of teaching. Integrating computer technology and WebQuest in teaching is a highly recommended strategy to help Egyptian business teachers to be self-directed and life-long learners.*

Keywords: *Business education, computer-mediated instruction, WebQuest, self-directed learning readiness, teaching performance*

Introduction and Theoretical Background

In our rapidly shifting world where change often seems to be the only stable attribute, self-directed learning is especially important (Knowles, 1975). Self-directed learning involves both utilization of cognitive skills and executive control over the learning process. Self-directed learners can set personal learning goals, formulate plans and select strategies for dealing with a given learning task, apply their existing knowledge and skills to the task, monitor and evaluate their own progress, and transfer newly developed skills from one problem-solving domain to another (Lieberman & Linn, 1991).

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A large body of research and literature about self-directed learning has been presented in the decade of the 1990s. The literature shows a variety of terms and phrases that describe the concept of self-directed learning. These terms have expanded to include: independent learning, individual responsibility toward learning, isolated learning, self-acquired knowledge, learning without a teacher, intrinsically motivated learning, self-directed learning pursuits, self-guided learning, self-managed learning, self-regulated learning, self-taught, solitary learning, student generated learning, teacher less individual learners, and unsupervised learning (Heimstra & Sisco, 1990). These phrases serve as evidence for the relevance of self-directed learning.

Self-directed learning models have been widely adopted in all educational settings. Examples are plentiful such as inservice education, graduate education, undergraduate education, continuing education, human resource development, professional education, technical training, and remedial education (Knowles, 1984).

Research about learning on the web and the Internet suggests several ways that web activities can be used to encourage students to be self-directed, autonomous learners. Gray (1999) proposes that the Web may be "one of the most powerful and important self-directed tools in existence" (p. 120). The Web has the potential to deliver new modes of learning, overcome lack of resources, and time and space boundaries. In addition, it offers equal opportunities for students to participate in various activities.

Thus, the web-based environment offers an optimal alternative for boosting self-directed learning. This is quite evident for the current generations who have the privilege to access various Web-based materials and activities. Tapscott (1998) anticipated that

> "next generations will shift from linear to hypermedia and will adopt new techniques that encourage construction and discovery of knowledge. Thus, learning will be student-centered. Learners will no longer be required to absorb knowledge for final exams; rather they will have to navigate the Web and develop life-long learning skills" (p.143).

Certainly, this shift requires well-prepared teachers who master not only the subject matter material, but also modern technology skills which are necessary for survival in the 21st century.

Thus, among other skills, teachers need to acquire self-directed learning competences. In fact, self-directed learning is the central theme of adult education. There is general agreement among experts that there is a certain amount of self-direction within every individual and that self-directed learning may occur in many different settings and in varying degrees of learner autonomy (Confrssore & Grovell, 1994).

Meanwhile, self-directed learning has the potential for boosting students' motivation. The greater access to computers and the Internet offers a viable means

for promoting self-directed learning among college students. Apparently, this is in full agreement with the constructivist principles that encourage learners to become knowledge producers, rather than knowledge consumers.

Malcolm Knowles' (1984) model serves as a resource for planning self-directed learning. This model views learners as active participants who construct relevant activities based on their own needs and interests. On the other hand, the instructors are facilitators who aim to promote self-directed learning among participants. According to Knowles (1984), self-directed learning is:

> a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes (Langenbach, 1988, p. 163).

As an advocate of andragogy, Knowles calls for developing self-directed learning in order to satisfy learners' needs to survive in a rapidly changing technological world.

Brookfield (1986) differentiates between "self-directed learning" and "self-directed education." Whereas the former is related to the "activity of acquiring skills and knowledge with minimum professional assistance, the latter refers to the management of the external conditions that bring about self-learning" (p. 46). Thus, Brookfield emphasizes the notion of helping adults learn. His definition of self-directed learning explores the various aspects of facilitating self-directed learning successfully. Through individual reflection and interaction with facilitators and peers, self-directed learning is enhanced.

Yet, computer mediated technologies offer unique opportunities for promoting self-directed learning through various applications and activities. In fact, various applications have been effective in helping learners overcome difficulties through distributed, instructional activities that match learners' time, place and abilities (Reeves & Reeves, 2008; Schutte, 2005; Tutty & Klein, 2008). Today social networks serve as a supportive learning environment in which learners can find new knowledge and acquire new skills that are needed to establish and construct new experience and meaningful learning. Therefore, significant gains have been reported (Alkharusi, Kazem, & Al-Musawai, 2010) which confirm the positive effects of computer-mediated instruction in various academic courses.

Teaching is a unique profession that requires teachers to be well prepared for promoting dialogic interaction in order to help learners maximize their performance and experience. To this end, teachers could provide a supportive environment that enhances opportunities of dialogue, debate, and a sense of community (Oliver & Omari, 2001).

Heimstra (1994) agrees that self-directed learning should have the following qualities: (a) individual learners can become empowered to take increasingly more responsibility for various decisions associated with the learning endeavor;

(b) self-direction is best viewed as a continuum or characteristic that exists to some degree in every person and learning situation; (c) self-direction does not necessarily mean all learning will take place in isolation from others; (d) self-directed learners appear to be able to transfer learning, in terms of knowledge and study skill, from one situation to another; (e) self-directed study can involve various activities and resources, such as self-guided reading, participation in study groups, internships, electronic dialogues, and reflective writing activities; and (f) some educational institutions are finding ways to support self-directed learning through open-learning programs, individualized study options, non-traditional course offerings, and other innovative programs.

Basile and Aquila (2002) reported that learners feel comfortable when using computer applications in general and the Internet in particular. This was reflected through students' positive attitudes toward these applications which were used to teach the principles of the financial accounting course. However, students who used the computer more frequently reported more positive attitudes toward delivery methods and course management systems.

In their study, Bartlett & Kotrlik (2001) reported that business teachers tend to use self-learning resources that they encounter as a result of doing their jobs. The findings from their study indicate that university business teacher educators should find ways to integrate self-learning skills into instruction and encourage self-learning resources such as professional organizations, mentoring, demonstrations, and observations.

Also, there have been attempts to quantify self-directedness. Guglielmino (1977) presented the "Self Directed Learning Readiness Scale" (*SDLRS*) in order to describe self-directedness empirically. The *SDLRS* is a widely accepted means of quantifying an individual's readiness for self-directed learning. The *SDLRS* is a self-reporting scale consisting of 58 items, including both positively- and negatively-phrased statements. Readiness for self-directed learning depends on agreement to the positive statements and disagreement to the negative ones. Guglielmino explains that the scale was developed through a Delphi survey by a panel of 14 experts in the field of adult education. A reliability coefficient (Cornbach's Alpha) of .87 was estimated for the scale.

Self-directed learning is integral to education. Adoption of self-directed learning techniques in teaching is the recognition of adult learners' ability to be independent, self-directed, and self-organized, whereby they may publicly demonstrate their learning. Self-directedness in learning is expected to boost collaborative efforts among peers in order to develop interdependence. In fact, teachers who identified themselves as self-directed learners tend to encourage self-direction among students (Mathai, 2000). Thus, the major advantage of self-directed learning is that it has the potential to improve the quality of learning outcomes both on the short and long terms (Garrison, 1997). Web-based activities are conducive to more individualized and differentiated learning experiences than is often possible in a face-to-face classroom. Students in a web-based environment

are able to work at a pace consistent with their rate of learning, have more time for reflection, feel more in control of the learning process, and engage in more self-directed and independent learning (Thomson, 2010).

WebQuests have become a major online delivery mode. The WebQuest is a resource-based learning approach. It is also a learner-oriented technique that depends on open-ended tasks. These tasks could be designed by either learners alone or by both learners and teachers (Hannafin, 1997; Harris, 1999). Valmont (2003) notes that the WebQuest is one of the most common online applications that help learners to gather, organize, analyze, and share information with others through online communications tools.

These benefits of computer and the WebQuest indicate that computer-mediated instruction and web applications can be effective means of meeting the needs of many business education teachers.

The Problem

Understanding how to learn has been one of the most important challenges that many educational systems encounter. Computer and communication technologies are changing educational practices. These new instructional practices pose continuous challenges to business education teachers. Studies are needed to help preservice business education teachers become lifelong learners in order to face and overcome any current and future instructional challenges.

Business education teacher programs in Egypt are still preparing teachers in traditional ways without integrating new educational practices and tools. Thus, this research investigates the effect of using computer-mediated instruction and the WebQuest on preservice business education teachers' self-directed learning readiness levels and teaching performance. Such knowledge could impact the preparation of preservice teachers. By placing a greater emphasis on understanding the relationship between using the WebQuest and self-directed learning readiness among these prospective teachers, we may be able to solve many educational problems and improve business education instructional practices.

Research Hypotheses

1. There is no significant effect for using computer-mediated instruction and the WebQuest on preservice business education teachers' self-directed learning readiness.
2. There is no significant effect for using computer-mediated instruction and the WebQuest on preservice business education teachers' teaching performance.
3. There is no significant relationship between business education teachers' self-directed learning readiness and their teaching performance.

Research Design and Procedures

Participants

The target population of this research is all available preservice business education teachers in the College of Education at Tanta University in Egypt during the spring semester of 2011. The population was 116 preservice teachers registered in the third year at the time of conducting this research. A sample of 70 participants from this target population was selected randomly to participate in this research. This sample was assigned randomly into two groups, the experimental group and the control group (35 participants in each group). Permission to collect the data from this sample was granted by Tanta University.

Research Variables

Independent variable: Computer-Mediated Instruction and the WebQuest (the new delivery mode)

Dependent Variables: Self-directed Learning Readiness Level and Teaching Performance

Design

The true experimental with randomized subject pre-test and post-test control group design was used in the current research. This design was selected to guarantee that changes in the experimental group were not affected by any other variables but the new treatment. Table 1 contains some details regarding this design.

Table 1

Experimental Design Details

(R)	Group	Pre-test	Independent Variable	Post-test
Randomized selection and assignment	Experimental Group	Self-Directed Learning Readiness Scale Observation checklist	Deliver the content through integration mode of computer-mediated instruction and the WebQuest	Self-Directed Learning Readiness Scale Observation checklist
	Control Group	Self-Directed Learning Readiness Scale Observation checklist	Deliver the content through traditional (regular) mode, face-to-face without using computer or Web activities	Self-Directed Learning Readiness Scale Observation checklist

Instruments

(1) Self-Directed Learning Readiness Scale (SDLRS)

The Self-Directed Learning Readiness Scale (*SDLRS*) is a self-reporting scale consisting of 58 items, including both positively- and negatively-phrased statements. It was developed by Guglielmino (1977) through a Delphi survey by a panel of 14 experts in the field of adult education. *SDLRS* depends on agreement to the positive statements and disagreement to the negative ones. A reliability coefficient (Cornbach's Alpha) of .87 was estimated for the *SDLRS*. For the purpose and the context of this research, *SDLRS* was translated into Arabic Language. Permission to use the *SDLRS* was granted by the author.

(2) Teaching Performance Observation Checklist

To measure the teaching skills among pre-service business education teachers, the researcher developed an observation checklist. This observation checklist consists of 30 items reflecting three main teaching performance tasks: planning, implementation, and evaluation. The planning task contains 6 items. The implementation task contains 18 items. Finally, the evaluation task contains 6 items. All items were designed based on the analysis of teacher behavior during the teaching practices. Teaching behavior reflects the extent to which the pre-service teacher is able or not able to introduce and deliver teaching skills during the practicum program. The teaching performance observation checklist was applied twice. A reliability coefficient of .92 was estimated for this checklist.

Materials and Procedures

For developing and implementing the computer-mediated instructional events and WebQuest tasks, the ADDIE instructional design model was utilized. The ADDIE model is a systematic instructional design model consisting of five phases: Analysis, Design, Development, Implementation, and Evaluation.

Analysis Phase. During analysis phase, the researcher identified the learning and performance problems, the goals and objectives, the student's needs, existing teaching knowledge and skills, and any other characteristics. Also in this phase, the researcher identified the delivery options, which were based on the integration of computer-mediated instruction and WebQuest tasks.

Based on learning analysis outcomes and the students' characteristics, the goal of the instructional program is stated. The goal is to develop teaching performance and self-directed learning readiness among pre-service business education teachers.

Design Phase. In the design phase, the researcher specified learning and instructional objectives. Detailed storyboards were made and content was determined. The researcher also developed models of lesson plans and selected the media required to acquire teaching knowledge and skills. The use of interactive

activities such as multiple choice, true and false, fill in the blank and links to websites were all designed to enable students to learn teaching skills easily.

The instructional objectives were the following:

1. Writing instructional objectives.
2. Analyzing learners' and instructional content and context.
3. Selecting and using instructional methods suitable for business education subject matter.
4. Applying classroom management techniques.
5. Selecting and using instructional media and activities.
6. Applying assessment techniques to measure learning outcomes.
7. Preparing relevant lesson plans for business education subject matters.

These objectives were presented through seven computer-mediated instructional modules as illustrated in Table 2.

During the design phase, the WebQuest tasks were developed and integrated with computer-mediated instructional activities. According to Dodge (2003), WebQuest design process has six main steps. These steps include: (1) introduction, (2) task, (3) resources, (4) processes, (5) evaluation, and (6) summary. These six steps were adopted in the current research through integration of WebQuest along with computer-mediated instructional activities to help students acquire teaching performance skills.

Development Phase. In this phase, an actual creation (production) of the content and learning materials took place. An instructional program was developed by using two types of software: Macromedia Dreamweaver and Macromedia Flash MX to produce the animated pages. The main page of the program in Dreamweaver contains the three main icons which are: Start Here, Instructional Modules, and Web Quest Tasks. The e-content for all modules was saved on CD and delivered to each student in the experimental group after completing pre-tests.

Table 2

The Integrated Strategy Between Computer-Mediated Instruction and WebQuest

Module #	Module Title	Computer-Mediated Instruction	WebQuest Tasks
(1)	Instructional Objectives	Reading e-text supported by multimedia objects regarding instructional objectives.	Searching and collecting web sites regarding the concepts and domains of instructional objectives. Reading and analyzing the content of specific websites given by the teacher.

Table 2 (continued)
The Integrated Strategy Between Computer-Mediated Instruction and WebQuest

(2)	Analyzing learners and content	Doing interactive activities regarding content analysis. Making a PPT presentation about types of knowledge and skills in business education.	Making a list of business concepts in some business domains such as marketing and accounting. Finding and organizing a list of web sites that contain business soft skills.
(3)	Instructional methods and strategies	Watching e-video regarding best practices in applying teaching strategies in teaching business subjects. Evaluating e-model of in-service teachers teaching performance.	Making web search about business education e-lessons. Selecting the best e-lesson plan Sharing e-lesson plans with other classmates.
(4)	Classroom management	Watching and analyzing samples of daily classroom instructional problems through e-video modeling. Reading e-chapter regarding types of learner and teacher interaction behavior.	Summarizing the content of 5 web sites containing strategies of classroom management techniques. Making a web search regarding time management in teaching practices. Making a list of best practices in teaching business education subjects.
(5)	Instructional media	Reading and analyzing e-book chapters about applying multimedia and interactive media in teaching. Preparing presentations about "learning with technology" in business education.	Making web search about the differences between multimedia and hyper media. Making a list of educational web sites that use interactive media in teaching. Making an online chat with educational media production companies.
(6)	Performance assessment	Doing interactive activities regarding the differences between measurement, assessment, and evaluation. Listening to an audio text about new approaches in assessment and evaluation of student performance.	Making a list of web sites that present standardized tests in education. Making and sharing e-portfolio assessment in business education. Preparing and sharing a PPT regarding scaling rubrics.
(7)	Lesson plan	Watching e-video modeling regarding the ideal business education lesson plans	Preparing e-lesson plans in business education subject matter and sharing them with other classmates through e-mail.

Implementation Phase. During this phase, the developed modules and WebQuest tasks were delivered to the experimental groups through a micro teaching lab. After putting the program into action, the effectiveness of the teaching and training materials and activities were evaluated.

Evaluation Phase. This phase consists of formative and summative evaluation techniques. Formative evaluation was presented in each stage of the ADDIE process. A preliminary evaluation of the computer-mediated materials was conducted by some jury members majoring in educational technology and business education. Some modifications were made based on their suggestions. Summative evaluation consisted of teaching performance observation checklist and self-directed learning readiness scale.

Results

Hypothesis 1: There is no significant effect for using computer-mediated instruction and WebQuest on pre-service business education teachers' self-directed learning readiness. To test this hypothesis, the researcher computed descriptive statistics and conducted a One-Way Analysis of Covariance (ANCOVA) to eliminate the effect of pre-testing. Tables 3 and 4 present the findings of descriptive and inferential statistics respectively.

Table 3

Descriptive Statistics for Group Scores on Self-Directed Learning Readiness

Group	Mean		*SD*	
	Pre	Post	Pre	Post
Experimental Group $N = 35$	188.46	229.74	25.17	26.34
Control Group $N = 35$	193.91	199.66	22.96	27.91

Note: Means were derived using a five-point Likert scale with 5 = Strongly Agree, 4 = Agree, 3 = Undecided, 2 = Disagree, and 1 = Strongly Disagree

Table 4

One-way ANCOVA for Between Group Differences on Self-Directed Learning Readiness

Source	Type III Sum of Squares	*df*	Mean Square	*F*	*p*	Partial Eta Squared
Pretest	8182.614	1	8182.614	13.086	.001	.163
Group	18322.552	1	18322.552	29.304	.000	.304
Error	41891.956	68	625.253			
Total	65914.7	69				

Table 3 shows that the preservice business education teachers' self-directed learning readiness in the experimental group scored higher than the participants in the control group in the post-testing ($M = 229.74$ and $M = 199.66$) respectively.

There were less variations existing among students in the experimental group (*SD* = 26.34) than the control group (*SD* = 27.91).

In addition, Table 4 shows that there was a significant difference between the experimental group and the control group. This difference was in favor of the experimental group ($F1, 68) = 29.304$; $p = .000$). Also, Table 4 shows that the amount of variance in the dependent variable (self-directed learning readiness) that was accounted for by the independent variable (computer-mediated instruction and WebQuest) is equal to 30%. These findings explain that the computer mediated instruction and WebQuest have a significant effect on the pre-service business education teachers' self-directed learning readiness. Based on these findings, we can reject the first hypothesis.

Hypothesis 2: There is no significant effect for using computer-mediated instruction and the WebQuest on pre-service business education teachers' teaching performance. To test this hypothesis, the researcher computed descriptive statistics and conducted a One-way Analysis of Covariance (ANCOVA) to eliminate the effect of pre-testing. Tables 5 and 6 present the findings of descriptive and inferential statistics respectively.

Table 5

Descriptive Statistics for Group Scores on Teaching Performance Observation Checklist

Group	Mean		*SD*	
	Pre	Post	Pre	Post
Experimental Group $N = 35$	33.46	68.29	3.38	12.16
Control Group $N = 35$	32.66	51.97	3.15	6.85

Note: Means were derived using a three-point Likert scale with 3 = Good, 2 = Average, and 1 = Poor.

Table 6

One-way ANCOVA for Between Group Differences on Teaching Performance Observation Checklist

Source	Type III Sum of Squares	*df*	Mean Square	*F*	*p*	Partial Eta Squared
Pretest	15.489	1	15.489	0.157	.693	0.002
Group	4521.571	1	4521.571	45.855	.000	0.406
Error	6606.625	68	98.606			
Total	11279.843	69				

Table 5 shows that the pre-service business education teachers' teaching performance in the experimental group scored higher than the participants in the control group in the post testing ($M = 68.29$ and $M = 51.97$) respectively. There were less variations existing among students in the control group ($SD = 6.85$) than the experimental group ($SD = 12.16$).

In addition, Table 6 shows that there was a significant difference between the experimental group and the control group. This difference was in favor of the experimental group (F 1, 68) = 45.855; p = .000). Also, Table 6 shows that the amount of variance in the dependent variable (teaching performance) that was accounted for by the independent variable (computer-mediated instruction and WebQuest) is equal to 41%. These findings explain that the computer mediated instruction and WebQuest have a significant effect on the pre-service business education teachers' teaching performance. Based on these findings, we can reject the second hypothesis.

Hypothesis 3: There is no significant relationship between business education teachers' self-directed learning readiness and their teaching performance. To test this hypothesis, the researcher used the experimental group post-test scores to compute the Pearson Correlation Coefficient between pre-service business education teachers' score on the Self-directed Learning Readiness Scale and their score on the teaching performance observation checklist. Table 7 summarizes this result.

Table 7

Pearson Correlation Coefficient between the Experimental Group Post-test on Self-Directed Learning Readiness Scale and Teaching Performance Observation Checklist

Variables	Pearson Correlation Coefficient	*df*	*p*
Self-Directed Learning Readiness Scale & Teaching Performance Observation Checklist	.409	68	.000

Table 7 shows that there is a positive and significant relationship between pre-service business education teachers' score on the Self-Directed Learning Readiness Scale and the score on the teaching performance observation checklist (r68 = .409; p = .000). This finding indicates that teaching performance is affected by teachers' self-directed learning readiness. Based on these findings, we can reject the third hypothesis.

Discussion and Conclusion

Educational programs in Egypt are facing many challenges. To overcome obstacles and educators should give a high priority to implementing digital technology into various fields in order to prepare more qualified teachers. Current findings revealed that there is a real opportunity to improve Egyptian business education teachers' teaching performance and their ability to be self-directed and life-long learners by integrating computer technology and multimedia in delivering teaching at all educational levels.

Computer-mediated instruction and WebQuest activities are effective in delivering teaching. Current results showed that there is a significant difference

between the experimental and the control group in both self-directed learning readiness and teaching performance. This difference was in favor of the experimental group which used an integrated strategy of computer-mediated instruction and WebQuest tasks. This finding is similar to the findings of other studies (Alkharusi et al., 2010; Basile & Aquila, 2002; Reeves & Reeves, 2008; Schutte, 2005; Tutty & Klein, 2008).

A significant relationship also was found between pre-service business education teachers' teaching performance and their self-directed learning readiness level. This may be due to the effect of incorporating this new teaching strategy that integrates WebQuest tasks and computer-mediated instruction. This result is an important indicator to the effectiveness of the usages of computer technology and Web applications in teaching practices. This also ascertains the importance of resource-based learning in educational settings. Resource-based learning has become a characteristic of our daily-life learning due to the proliferation of computer and communication technologies.

In conclusion, modern instructional technology is badly needed in order to advance the Egyptian educational system and keep pace with up-to-date advancements in various academic fields. In particular, the incorporation of this technology is essential for the development of pre-service teachers' abilities to become self-directed and life-long learners.

Recommendations

Based on research findings, the following recommendations are suggested for improving the teaching of business education:

1. There exists a real need for examining the effect of using the WebQuest and computer-mediated applications on learners' creative thinking skills.
2. Schools and departments of business education in Egypt should develop a new training plan and strategy to integrate various applications of computer-mediated instruction and the WebQuest into business education programs.
3. The utilization of computer technology and the Internet in Egyptian business secondary schools should be evaluated based on the total quality of technology integration.
4. A qualitative study is needed to explore the best practices of using computer technology in teaching among secondary school business education teachers and students.
5. Further research should address the application of inquiry and resource-based learning skills in pre-service teacher educational programs.
6. Finally, more studies should examine in-service business education teachers' self-directed learning readiness.

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