Wendt and Courduff *International Journal of Educational Technology in Higher Education* (2018) 15:33
https://doi.org/10.1186/s41239-018-0115-0

International Journal of Educational Technology in Higher Education

RESEARCH ARTICLE Open Access

The relationship between teacher immediacy, perceptions of learning, and computer-mediated graduate course outcomes among primarily Asian international students enrolled in an U.S. university

Jillian L. Wendt[1*] and Jennifer Courduff[2]

* Correspondence:
jillian.wendt@udc.edu
[1]University of the District of Columbia, 4200 Connecticut Avenue NW, Washington, D.C. 20008, USA
Full list of author information is available at the end of the article

Abstract

This study employed a correlational research design to determine if a relationship existed between international students' perceptions of teacher immediacy and students' end of course grades in computer-mediated, U.S. graduate courses. Analysis demonstrated a statistically significant negative relationship between teacher immediacy and end of course grades, thus indicating that higher scores on the teacher immediacy scale relate to lower end of course grades. These findings are contrary to previous research findings with U.S. students engaging in computer-mediated courses, thus demonstrating the unique characteristics and needs of international students. Findings hold important implications to the design and delivery of graduate level courses for the international student population and reiterate the need for further investigation regarding the international student experience in U.S. higher education.

Keywords: Teacher immediacy, International students, Grades, Implicit communication theory, Computer-mediated

Introduction

In a world where connectivity continues to increase, offerings for technology-enhanced education continue to increase. The popularity of international education has created a need to study the international student experience when enrolled in U.S. courses, especially those that occur in non-traditional settings. It is well known that international students who attend U.S. universities encounter unique challenges related to language and cultural barriers (Palermo-Kielb & Fraenza, 2018). As a result, an emerging body of research has suggested that those who design university courses for international students should consider how teacher immediacy and student perceptions of the learning experience impact student satisfaction and course grades (Estepp & Roberts, 2015). However, most research on teaching immediacy in the computer-mediated

and online learning environments and student learning has focused on white Americans rather than the multicultural context (Estepp & Roberts, 2015; Rucker & Gendrin, 2003). This study seeks to understand the relationship between teacher immediacy and students' perceived learning among international students enrolled in computer-mediated, graduate level courses in a U.S. university. For the purposes of this study, international students are defined as non-U.S. citizens who may temporarily reside in the U.S. or may reside in another country while enrolled in a course offered by a U.S. institution of higher education.

The range of cultures international students bring to the higher education environment is diverse and broad; thus, cultural specificities become apparent (Liu, Liu, Lee, & Magjuka, 2010) and must not be overlooked in higher education today (Stork & Hartley, 2014). It is purported that "culture impacts every facet of online learning, from course and interface design, to communication in a sociocultural space, and to the negotiation of meaning and social construction of knowledge" (Gunawardena & Jung, 2014, p. 1). However, while it is widely accepted that international students encounter unique challenges, the majority of U.S. courses are currently designed for and respond to the needs of non-international students from a model or design perspective (Hampton, 2018; Liu et al., 2010; Parrish & Linder-VanBerschot, 2010). Understanding whether students with differing experiences and cultural distinctions perceive teacher immediacy and the learning process differently from U.S. students may be a key that would assist in unlocking international students' full learning potential within U.S. universities. Importantly, understanding international student perceptions may provide insight regarding instructional design that meets the needs of a culturally diverse population.

A focus on meeting the needs of a diverse population is necessary as a number of U.S. universities have increased recruitment of international students in order to offer educational experiences to students who otherwise may not have such opportunities and to increase institutions' financial opportunities. However, universities have often lagged behind the available research and, thus, may not have taken into consideration factors that enable international students to flourish and succeed (Liu et al., 2010; Parrish & Linder-VanBerschot, 2010). This is especially true in regards to the frameworks or models on which courses are designed and delivered. This is unfortunate as international students are often provided with supports that are not consistent with their unique needs or lack essential design elements that facilitate their success in U.S. higher education. While the lack of support has been documented, research that has examined the effectiveness of the models and frameworks on which the majority of distance learning courses in the U.S. are constructed has only recently begun to address the challenges that persist. Thus, understanding the role of teachers, the effect of teacher interactions on student success, students' perceptions of teachers, and students' perceptions of their own learning as they align with commonly utilized models and frameworks for instructional design would greatly contribute to the current literature base in order to provide practical applications to the design and delivery of U.S. courses to maximize international student success. As current initiatives seek to support all students, the international student experience cannot be overlooked. This study examines whether a relationship exists between international students' perceptions of teacher immediacy, perceived learning, and student achievement.

Theoretical framework

Two constructs, teacher immediacy and student learning perceptions, must be defined and contextualized within teaching and learning experiences in order to understand the context of computer-mediated learning. The construct of immediacy was first introduced by Mehrabian (1966, 1971) in interpersonal communication studies. Immediacy behaviors are those that improve psychological and physical closeness with others. A key underlying premise is that people tend to gravitate towards other individuals or things that they prefer or find desirable. People tend to avoid individuals or things that they perceive as undesirable (Mehrabian, 1971).

Teacher immediacy is defined as "nonverbal and verbal behaviors, which reduce psychological and/or physical distance between teachers and students" (Christophel & Gorham, 1995, p. 292). Examples of nonverbal immediacy behaviors include smiling, engaging in eye contact, maintaining a relaxed body position, and gesturing (Andersen, 1979). Verbal immediacy behaviors include actions such as incorporating humor, engaging in informal dialogue with students, and asking questions that solicit student opinions (Gorham, 1988). Previous research supports the premise that effective instruction is in part facilitated by a high level of instructor immediacy (Hampton, 2018; Kupczynski, Ice, Wiesenmayer, & McCluskey, 2010).

Building upon Mehrabian's (1966, 1971) work, Andersen (1979) examined the role of teachers' nonverbal immediacy behaviors in teaching-learning situations and concluded that these behaviors were significant predictors of teaching effectiveness. Subsequent research has revealed a positive relationship between teacher immediacy behaviors and student learning outcomes in a variety of educational settings and contexts (Arbaugh, 2001; Estepp & Roberts, 2015; LeFebvre & Allen, 2014; Witt, Wheeless, & Allen, 2004). Witt et al. (2004) conducted a meta-analytic review of the relationship between instructor immediacy and student learning among 81 studies and discovered significant correlations between teachers' verbal and non-verbal immediacy and student reports of perceived learning and affective learning. The correlation was less significant for the relationship between verbal and non-verbal immediacy and cognitive learning measures. In addition, based on this meta-analysis and various other studies, teacher immediacy has been found to be correlated with other aspects that contribute to learners' success in the classroom, including student motivation (e.g., Ballester, 2013, Christensen & Menzel, 1998; Christophel & Gorham, 1995), participation in classes (Roberts & Friedman, 2013), student perceptions of instructor credibility (Schrodt & Witt, 2006), and course satisfaction (Arbaugh, 2001). In short, increased perceptions of teacher immediacy correlate with positive student outcomes (Hampton, 2018; Roberts & Friedman, 2013).

Literature review

A robust body of literature exists that focuses on the intersection of culture, learning, and technology. It has been well established that the use of technology in education can both emancipate and subjugate learners, regardless of specific culture or ethnicity (Subramony, 2017; Thomas, 2017). In response, professional organizations have endeavored to provide guidelines for the promotion of diverse viewpoints and for the elimination of content and strategies that may either promote or oppress specific subgroups (see Association for Educational Communications and Technology (AECT), 2016a, 2016b). Importantly, it has also been recognized that the current models and frameworks for

instructional design of distance learning courses in the U.S. may not be culturally appropriate for all learners (Anderson, 2017). For instance, the cultural appropriateness of social constructivist approaches that are widely used in the Western world for Eastern learners has been questioned, as "learners may not always be able to successfully function in traditional [Western] distance learning settings" (Anderson, 2017, p. 91).

Steps have been taken to examine the equitable access of technology, but not necessarily the frameworks on which distance learning are currently constructed, especially in the U.S. Insufficient attention has been paid to the equitability of distance learning and the surrounding cultural issues of instructional design (Anderson, 2017; Subramony, 2017). As such, research has called for the need to examine existing theoretical models and, in the case of social constructivist models, a new model altogether (Anderson, 2017). The current study tackles the issue of equitability from another angle, in that rather than focusing on sociocultural aspects, the focus is on equitability within the models and frameworks on which the majority of current distance learning courses in the U.S. are constructed. Of relevance to the current study, therefore, is the strand of evidence pertaining to teacher immediacy and student learning outcomes in university-level education. Teacher-student rapport is a vital component for effective teaching and learning (Frisby & Martin, 2010; Johnson, Darrow, & Eason, 2008) and multiple studies over time have revealed a positive relationship between teachers' immediacy behaviors and students' learning in both traditional (Gorham, 1988; LeFebvre & Allen, 2014; Richmond, Gorham, & McCroskey, 1987; Titsworth, 2001; Walkem, 2014) and computer-mediated settings (Baker, 2004; Liu et al., 2010). Numerous studies have revealed positive correlations between teacher immediacy behaviors and students' perceived affective learning (Baker, 2004; Estepp & Roberts, 2015; Gorham & Christophel, 1990; Kearney, Plax, & Wendt-Wasco, 1985; Zhang, Liu, Liu, & Cole, 2014) and perceptions of teacher credibility and behavior (McArthur & Bostedo-Conway, 2012; Stork & Hartley, 2014). Estepp and Roberts (2015) examined college students and their self-reported perceptions of teacher immediacy and teacher rapport. Results indicated that students perceived that their instructors utilized verbal and non-verbal immediacy behaviors, but non-verbal behaviors were perceived to be used more often.

There is a body of literature emerging on the impact that cultural difference plays in teaching and perceived student learning as culture is how students learn (Hofstede, 1980; Hofstede & Hofstede, 2005). The cultural dimensions of learning framework (Parrish & Linder-VanBerschot, 2010) is based on the work of Hofstede and Hofstede (2005) and provides cultural dimensions through which course designers and instructors can recognize culturally based learning differences: social relationships, epistemological beliefs, and temporal perceptions. (Parrish & Linder-VanBerschot, 2010). Consequently, a Cultural Dimensions of Learning Framework (CDLF) was developed to help course designers develop courses that are culturally sensitive and in which instruction is adaptable to suit the needs of culturally diverse learning populations. While researchers debate the applicability of Western cultural frameworks to Eastern learners (Gunawardena & Jung, 2014), related literature posits that teacher immediacy and student perception of success is understood differently by students of differing cultures, and that addressing cultural differences within course delivery is crucial for student success (Estepp & Roberts, 2015; Parrish & Linder-VanBerschot, 2010). For instance, Rucker and Gendrin (2003) examined African American student perceptions of teacher immediacy when taught

by Euro-American instructors as compared to African American instructors and found that, when students were taught by an instructor of an identical background, they were able to identify more closely and experienced higher levels of teacher immediacy.

Glascock and Ruggiero (2006) conducted a study at a primarily Hispanic U.S. university and found that teacher immediacy significantly affects student perceptions of teacher credibility and that teacher ethnicity significantly affects student perceptions. As teacher credibility has been shown to impact student outcomes, their findings supported that a relationship exists between teacher immediacy and student course outcomes.

Park, Lee, Yun, and Kim (2009) compared Korean students in South Korea and in the U.S. and their perceptions of teacher immediacy. Korean students enrolled in the U.S. university reported higher levels of instructor immediacy. Results demonstrated that verbal immediacy was positively related to student satisfaction. The authors found that the U.S model of course design and delivery emphasizes high levels of teacher immediacy, confirming previous findings (Myers, Zhong, & Guan, 1998) that demonstrated high levels of teacher immediacy and perceptions of teacher immediacy among U.S. students enrolled in U.S. courses as compared to U.S. and Chinese students enrolled in courses in China.

Despite these understandings, U.S. courses are often designed and delivered based on models that may consider only residential students and only non-international students (Sadykova & Dautermann, 2009) or, in many cases, in ways that align with traditional Western distance learning settings (Anderson, 2017). In the process of course development, international students seem to be forgotten, seen as a "special need to be accommodated" (Subramony, 2017, p. 36), or the assumption is made that their experiences and needs for support are the same as non-international students, regardless of the push for U.S. institutions to recruit and retain international students.

With this deficit in mind, the research literature currently lacks study that has examined the international student experience and the role of teacher immediacy, as well as student perceptions of learning, in international student success when enrolled in U.S. programs and courses. It is necessary to determine if previous study that demonstrates the positive relationship between teacher immediacy and student outcomes with non-international student populations (LeFebvre & Allen, 2014), including perceived learning, can be generalized to the international student population enrolled in U.S. programs and whether the current model of what is deemed effective in the computer-mediated learning environment is indeed effective for the international student population.

Perceived learning

Perceived learning is the "set of beliefs and feelings one has regarding the learning that has occurred" (Caspi & Blau, 2008, p. 327). Perceived learning, a look back in time over the duration of a course, is the measure used by the student to evaluate growth in new knowledge or extension of prior knowledge, including both cognitive and socio-emotional experiences. Cognitive experience relates to gaining of new knowledge or understanding. Socio-emotional learning relates to the peripheral aspects of the learning process including feelings and experiences, student to teacher and student to student involvement and interaction, and feelings of innovation (Caspi & Blau, 2008). While learning is measured by

performance markers such as course grades, perceived learning is measured by what the student reports that he or she has learned.

Rovai and Barnum (2003) propose that final grades are not always the most complete measure of learning, leading to the need to examine alternate ways to measure learning, including self-reported measures such as perceived learning. Study has demonstrated that there is no significant difference in final grades and perceived learning, regardless of medium of delivery (Wells & Dellinger, 2011), thus supporting the use of perceived learning in examining student outcomes. Given the documented challenges related to technology enhanced delivery mediums (Kop, 2011; Rodney, 2002), an examination of factors related to perceived learning, including the relationship between perceived learning and course grades, would be helpful in providing a more comprehensive picture of practices that utilize computer-mediated communication and whether such practices support or hinder student success among the international population enrolled in U.S. courses.

In a study on students' perceived challenges in online learning environments, Muuro, Wagacha, Oboko, and Kihoro (2014) found that "considerable diversity exists among countries due to diversity in infrastructure support for e-learning and the learners' background" (p. 132). Muuro et al. (2014) also found that teacher presence and interaction between the learner and teacher had a positive impact on perceived learning. The findings support the need to explore relationships between teacher characteristics and practices, such as those that relate to teacher immediacy, as they are perceived by students, and student perceptions of learning.

Methodology

Research design & purpose

This study follows a predictive correlational research design in order to determine if a relationship exists between international students' perceptions of teacher immediacy, perceptions of learning, and students' achievement as measured by end of course grades when enrolled in computer-mediated graduate courses at U.S. university. The research question is as follows: Do international students' perceptions of teacher immediacy and levels of perceived learning predict end of course grades when enrolled in a U.S. computer-mediated graduate course?

In order to analyze the research question, a hierarchical multiple regression (HMR) analysis was conducted. The HMR allowed the researchers to determine whether a predictive relationship between teacher immediacy, perceived learning, and students' end of course grades exist while controlling for demographic factors (gender, ethnicity, and native language) and, if so, the extent of the relationship. In this study, the predictive variables were composite immediacy score and composite perceived learning score, and the criterion variable was students' end of course grades. In conformance with the design of the HMR (Warner, 2013), variables were entered into the analysis in blocks in order to determine what statistically significant predictive ability, if any, each set of variables demonstrated on the criterion variable. Block 1 consisted of the control variables of gender, ethnicity, and native language. Block 2 consisted of the addition of the predictor variable of composite immediacy score. Block 3 consisted of the addition of the predictor variable of composite perceived learning score.

Participants and setting

A convenience sample of 276 students enrolled in graduate courses at an accredited, non-profit international university located in northern Virginia served as the research sample for this study. After ethics approval was granted, students enrolled in the following courses during the Summer 2015 semester were provided the invitation to participate in the study: Computer (CMP) 511 Computer Architecture & Implementation, CMP 550 Information Technology (IT) Infrastructure, CMP 553 Analysis, Modeling, & Design, CMP 560 Software Engineering, CMP 612 IT Project Management, CMP 641 Operating Systems, and CMP 663 Web Applications Development. A total of 427 students were invited to participate. The response rate was calculated as 65%, but does not factor in students who were enrolled in multiple courses and, thus, was actually higher. Students who were enrolled in multiple courses were only allowed to complete the survey once. The sample consisted of 211 males and 65 females, with an average age of 25.50 years. The average number of semesters completed at the university, including the current semester, was 1.77 semesters. Additional demographics are presented in Table 1.

Participants were at least 18 years of age and were enrolled in one of the participating eight-week courses at the university. Each course was conducted in the residential setting and incorporated the use of computer-mediated components; specifically, the use of the Moodle™ learning management system. Moodle™ was used to provide students with access to course lectures, notes, supplementary learning materials, discussion forums, and submission links for course assignments. Courses were taught by veteran instructors who had between seven and 30 years' experience teaching in the higher education setting. Instructors reported their native countries as the following: China, Egypt, Ghana, Iran, and the U.S.

Procedures and instrumentation

During the fifth week of the semester, students were invited to participate in the study through a unique link in class that led to the informed consent, explanation of the study, and the survey, hosted in Google Forms™. The survey consisted of questions related to the course in which students were enrolled as well as demographic questions, items from the Verbal Immediacy Scale (Wilson & Locker Jr., 2008) and items from the Cognitive, Affective, and Psychomotor (CAP) Perceived Learning Scale (Rovai, Wighting, Baker, & Grooms, 2009).

Initially a 20-item scale, Gorham's (1988) Verbal Immediacy Scale examines students' perceptions of their teachers' immediacy. Subsequent study further refined the 20-item scale to a 17-item scale based on factor analysis with a large population and determined that the scale was a valid measurement instrument (Wilson & Locker Jr., 2008). The revised 17-item scale was used in this study as a predictor variable to measure students' perceptions of teacher immediacy. Students used a five-point Likert-type scale (1 = never to 5 = very often) to respond to statements such as, "The instructor uses personal examples or refers to experiences she/he had outside of class" and "The instructor uses humor in the course." Scores ranged from 5 to 85, with higher scores indicating increased perceptions of teachers' verbal immediacy. The split-half reliability from Gorham's (1988) initial use of the scale was .94 and subsequent study has further demonstrated good reliability (Baker, 2004; Wilson & Locker Jr., 2008).

Table 1 Participant demographics

Ethnicity	Asian = 99.6%
	Caucasian = .4%
Native Country	Bangladesh = 1.1%
	Cambodia = .4%
	India = 95.7%
	Mongolia = .4%
	Nepal = .7%
	Syria = .4%
	Vietnam = .4%
	Not reported = 1.1%
Native Language	Arabic & Turkish = .4%
	Bangla = .4%
	Bengali = .7%
	English = 8.0%
	Gujrati = .4%
	Hindi = 5.1%
	Hindi & Telugu = 2.5%
	Kannada = .4%
	Khmer = .4%
	Marathi = .4%
	Mongolian = .4%
	Nepali = .7%
	Tamil = .7%
	Telugu = 75.0%
	Urdu = .4%
	Vietnamese = .4%
	Not reported = 4.0%

The CAP Perceived Learning Scale was developed to measure perceived learning and consists of three components: cognitive learning, affective learning, and psychomotor learning (Rovai et al., 2009). The scale has demonstrated good reliability (Cronbach's alpha = .79) and has been validated for use in face-to-face and online learning environments (Rovai et al., 2009). The scale consists of 9 self-report items and utilizes a Likert-type scale, with 1 meaning "strongly disagree" and 5 meaning "strongly agree". Scores on each of the subscales range from 0 to 18 and 0 to 54 on the composite scale. Higher scores indicate an increased perception of learning. The CAP Perceived Learning Scale (Rovai et al., 2009) served as a predictor variable in this study and was used to measure perceived learning.

End of course grades for each of the participating students were obtained from the university registrar. The maximum grade that students could earn in each course was 100%.

Results

A hierarchical multiple regression (HMR) analysis was conducted to determine whether a predictive relationship between teacher immediacy, perceived learning, and students'

end of course grades existed while controlling for demographic factors (gender, ethnicity, and native language) and, if so, the extent of the relationship. All assumption tests were tenable. Descriptive statistics are shown in Table 2. The predictive variables showed a relationship with the criterion variable and with each other, although small, with no correlation coefficient over .7 (Warner, 2013). For the HMR, variables were entered into the analysis in blocks, as demonstrated in Table 3. The correlation matrix is shown in Table 4.

The results of the HMR model for Block 1, which consisted of the control variables of gender, ethnicity, and native language, did not reach statistical significance, $F(3, 272) = 1.44$, $p = .23$. The results of the HMR model for Block 2, which consisted of the addition of the predictor variable of composite immediacy score, did reach statistical significance, $F(4, 271) = 2.94$, $p = .02$. The model in Block 2 explained 4.2% of the total variance in end-of-course grades, with immediacy individually explaining 2.6% of the total variance in end-of-course grades. The model in Block 3, which consisted of the addition of the predictor variable of composite perceived learning score, did reach statistical significance, $F(5, 270) = 2.52$, $p = .03$. The overall model in Block 3 explained 4.5% of the total variance in end-of-course grades, with perceived learning individually explaining .3% of the total variance in end-of-course grades. However, it is important to note that R^2 change was not significant. Therefore, the addition of composite perceived learning score did not result in a statistically significant change in the explanation of the variance in end-of-course grades.

In the final model, immediacy made a statistically significant individual contribution to the model ($\beta = -.16$). A negative relationship existed between students' course grades and perceptions of teacher immediacy, although this relationship was very small and should be interpreted and applied with caution. The lower students' perceptions of teacher immediacy, the higher their course grades. The results of the HMR analysis are presented in Table 5.

Discussion

The results show that a statistically significant relationship exists between students' perceptions of teacher immediacy and end of course grades among international students enrolled in computer-mediated U.S. graduate courses, although the relationship is very small. The relationship between perceptions of teacher immediacy and end of course grades was negative, which indicates that increased teacher immediacy correlates with decreased end of course grades with the sample population studied. The strength of the relationship is small, indicating that the results of this study should be interpreted with caution and that further study is needed. However, the results are interesting as they are contradictory to the research literature which supports that increased levels of teacher immediacy lead to positive student outcomes (Baker, 2010; Wells & Dellinger, 2011). The

Table 2 Descriptive statistics

	M	SD	N
Verbal Immediacy	67.21	12.42	276
Perceived Learning	35.59	5.11	276
End of Course Grades	93.72	4.04	276

Table 3 Blocks for the HMR analysis

Block	Variable
Block 1	Demographics (Native Language, Gender, and Ethnicity)
Block 2	Composite Score on the Verbal Immediacy Scale (Wilson & Locker Jr., 2008)
Block 3	Composite Score on the CAP Perceived Learning Scale (Rovai et al., 2009)

results of this study also show that no relationship exists between students' perceived learning and end of course grades, which also differs from previous findings conducted with non-international populations (Rockinson-Szapkiw, Wendt, Wighting, & Nisbet, 2016; Rovai et al., 2009).

The findings of this study are overall contrary to what has been previously documented in the research literature (Arbaugh, 2001; LeFebvre & Allen, 2014; Witt et al., 2004), and provide insight into the possible differences between international populations and non-international populations enrolled in U.S. courses (Liu et al., 2010), especially in relation to the alignment of course design with commonly utilized models and frameworks in the U.S. As few studies currently exist that have considered the relationship between international students' perceptions of teacher immediacy and end of course grades when enrolled in U.S. graduate-level courses, these findings support the need for further study in determining why the relationship between international students' perceptions of teacher immediacy and achievement, albeit small, differs from non-international students' perceptions of teacher immediacy and achievement. Further study could involve qualitative evaluation that seeks to determine the subtle nuances of perceptions of teacher immediacy and achievement that are not easily measured through quantitative survey measures.

This is especially important when considering the existing research on culture in distance learning and the persistent ethnocentricism present in instructional design and delivery (Subramony, 2017; see also Powell, 1997). While the current findings require replication and do not imply causation, future study may hold important implications in course design, delivery, and best practices for teacher engagement with students in the computer-mediated environment. That is, the evidence that supports teacher immediacy as effective with non-international students in enhancing end of course grades does not appear to show a strong, positive relationship with international students' perceived and actual course outcomes based on this study's findings. The addition of qualitative evaluation could assist in providing in-depth understanding of the impact of ethnocentricism in instructional design and delivery. For instance, qualitative analysis could add to the knowledge base by providing an explanation of the experience international students may have when enrolled in U.S. courses, as well as the potential benefits or challenges of existing distance learning frameworks in students' course outcomes.

One further consideration that should be taken is culture. As the current study is exploratory in nature, the nuances of culture and specific causations of the findings were not examined. Culture has been cited as a factor that may influence immediacy perceptions and behaviors, as well as how native culture and cultural expectations differ among international populations (Estepp & Roberts, 2015; Hampton, 2018). Studies conducted in various locations within the U.S reveal divergent results concerning

Table 4 Correlation matrix

	Course grades	G	E	NL	VI	PL
Gender (G)	0.10	–	–	–	–	–
Ethnicity (E)	−.02	−.03	–	–	–	–
Native Language (NL)	.09	.10	−.19	–	–	–
Verbal Immediacy (VI)	−.16	−.04	−.02	.02	–	–
Perceived Learning (PL)	−.09	−.04	−.04	−.02	.23	–

$p < .05$

cultural impact on immediacy behavior (Erichsen & Bolliger, 2011; Liu et al., 2010; Parrish & Linder-VanBerschot, 2015; Sadykova, 2014). The results of the present study provide preliminary evidence that culture may play a role in student learning in the computer--mediated learning environment and align with previous study that has indicated that social constructivist approaches that are typical in Western distance education may not be conducive to learning for all students, especially Eastern learners (Anderson, 2017). This could be because certain aspects of the teaching and learning process (e.g. high levels of teacher immediacy) are not valued within the culture of the students' origin (Anderson, 2017; Stork & Hartley, 2014), because communication that supports the learning process and meeting of goals requires differing media depending on culture, or because different cultures place different emphasis on online information and the specific uses of online information and means of communication (Nunn, Brown-Joseph, & Hill, 2017). Qualitative analysis could provide further insight regarding students' culture, cultural perceptions of learning, cultural expectations for instructors and students, and cultural influence on student outcomes when enrolled in U.S. courses. Thus, there are many factors that may be involved that influence the findings of the current study that quantitative measures cannot fully address. The results of this study support the need for a closer examination of the role of culture from an instructional design model perspective.

There are several other reasons why the findings of this study may demonstrate differences between the perceptions and experiences of international students and those of non-international students as documented in the research literature. The first consideration is the choice of measurement instruments. While the use of self-reporting measures has been found to be reliable across populations (Corrallo, 1994; Pace, 1990), the use of a self-reporting measure in populations that experience an increased power

Table 5 Hierarchical multiple regression analysis results

	*R*2 change	*F* ratio for *R*2 change	*B*	*SE*	β	*t*	*p*
Block 1	.02	1.44					.23
Block 2	.03	7.34					.01
Block 3	.00	.84					.36
Gender			.87	.57	.09	1.51	.13
Ethnicity			.19	4.11	.00	.05	.96
Native Language			.09	.07	.08	1.26	.21
Verbal Immediacy			−.05	.02	−.16	−2.71	.01
Perceived Learning			−.04	.05	−.06	−.92	.36

$p < .05$; $\alpha = .05$

differential with teachers might result in non-reporting of negative responses. The reliability of students' responses may be debatable if a power differential was experienced between students and teachers. As the majority of the students involved in this study were primarily from one country (India) and considering that power differential does exist in some Asian cultures (Anderson, 2017; Stork & Hartley, 2014), it is possible that some students might have experienced a power differential with teachers during the normal activities of the course (Estepp & Roberts, 2015; Zhang, 2013); thus, influencing their responses. The possibility of unreliable responses was mitigated in this study as the teachers assigned to the participating classes were not present during survey administration and did not analyze the data. Rather, the lead researcher conducted data collection and analysis and assured students that their responses would not be reported to their teachers. Further study might explore means to measure student perceptions that does not involve self-reporting, that involves additional measures to ensure reliability, or that utilizes qualitative approaches to determine the extent to which students interacted with their teachers, the quality of such interactions, and the quantity of such interactions. While the university from which the sample was drawn was not designated as an Asian university, the majority of students who participated in this study were Asian. Thus, replication of this study with other international populations may yield different results.

Additionally, further study might examine cultural contexts more fully, as culture and intercultural differences may play a role in the findings of this study. This is especially important given that the majority of participants in this study reported India as their native country, yet does not mitigate the importance of the novel findings of this study.

Limitations

There are several limitations to this study. Most importantly, the results of this study may not be generalizable to all populations. Cultural contexts, cultural competency, and intercultural differences were not examined or explored in this study. As the sample population consisted of a greater number of males than females, the results may not be representative of a more equitable population. Examination of the experience of females may yield different results. The results may not be generalizable to students enrolled in other courses, programs, or universities. The current findings, however, provide a foundation for future research by demonstrating that what is understood to support student learning from an instructional design model perspective among U.S. students in the computer-mediated learning environment may not be the best model for supporting international students (Parrish & Linder-VanBerschot, 2015).

Another limitation of this study is the sample size. While the sample size was adequate per research convention (Rovai, Baker, & Ponton, 2013), a larger sample size may yield different results. Likewise, a sample that represents a more equitable distribution of participants from countries around the world may produce different results. Finally, study that examines different factors and their respective influences on student course outcomes, including non-academic outcomes, such as satisfaction, sense of community, and self-efficacy, may provide a clearer picture of the international student experience. Future study should examine a combination of quantitative and qualitative factors.

Conclusion

The results of this study point towards factors other than teacher immediacy and perceived learning as being potential predictors of student grades. While the reason why teacher immediacy was negatively related to international student course outcomes is unknown, the findings of this study bring attention to the differences that may exist between students of different cultures, experiences, and perceptions and the mainstream dominant culture for which many U.S courses are designed and implemented. Although these findings should be interpreted and applied with caution, they do offer areas in which further research is warranted and support that international students may require different supports than non-international students in order to experience success in U.S. graduate courses.

Availability of data and materials

Data will not be shared in order to conform to university Institutional Review Board requirements in preserving participant confidentiality.

Authors' contributions

All authors were involved in research design, implementation of the study, data gathering, data analysis, and writing of the manuscript. All authors approve submission of the manuscript for publication consideration. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Publisher's Note

Author details

[1]University of the District of Columbia, 4200 Connecticut Avenue NW, Washington, D.C. 20008, USA. [2]Azusa Pacific University, 701 E. Alosta Avenue, Azusa, CA 91702, USA.

Received: 23 February 2018 Accepted: 12 June 2018
Published online: 05 September 2018

References

Andersen, J. F. (1979). Teacher immediacy as a predictor of teaching effectiveness. In D. Nimmo (Ed.), *Communication yearbook*, (vol. 3, pp. 543–559). New Brunswick: Transaction Books.

Anderson, B. (2017). How cultural factors influence the use of social constructivist-based pedagogical models of distance learning. In A. D. Benson, R. Joseph, & J. L. Moore (Eds.), *Culture, learning, and technology: research and practice*, (pp. 91–108). New York: Routledge.

Arbaugh, J. B. (2001). How instructor immediacy behaviors affect student satisfaction and learning in web-based courses. *Business Communication Quarterly*, *64*(4), 42–54.

Association for Educational Communications and Technology (AECT). (2016a). What is AECT? Retrieved from http://aect.site-ym.com/?page=about_landing. Accessed 15 June 2018.

Association for Educational Communications and Technology (AECT). (2016b). Code of professional ethics. Retrieved from http://aect.site-ym.com/members/group_content_view.asp?group=91131&id=309963. Accessed 15 June 2018.

Rockinson-Szapkiw, A. J., Wendt, J. L., Wighting, M., & Nisbet, D. (2016). The predictive relationship among the CoI framework, perceived learning, and online graduate students' course grades. The International Review of Research in Open and Distributed Learning, 17(3). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/2203/3683.

Baker, C. (2010). The impact of instructor immediacy and presence for online student affective learning, cognition, and motivation. *Journal of Educators Online*, *7*(1), 1–30.

Baker, J. D. (2004). An investigation of relationships among instructor immediacy and affective and cognitive learning in the online classroom. *Internet & Higher Education*, *7*(1), 1–13.

Ballester, E. P. (2013). Verbal and nonverbal teacher immediacy and foreign language anxiety in an EFL university course. *Porta Linguarum*, *23*, 9–24. Retrieved from http://www.ugr.es/~portalin/articulos/PL_numero23/1%20%20Elisabet%20Pladevall.pdf.

Caspi, A., & Blau, I. (2008). Social presence in online discussion groups: Testing three conceptions and their relations to perceived learning. *Social Psychology of Education*, *11*(3), 323–346. https://doi.org/10.1007/s11218-008-9054-2.

Christensen, L. J., & Menzel, K. E. (1998). The linear relationship between student reports of teacher immediacy behaviors and perceptions of state motivation, and of cognitive, affective, and behavioral learning. *Communication Education*, *47*(1), 82–90.

Christophel, D. M., & Gorham, J. (1995). A test-retest analysis of student motivation, teacher immediacy, and perceived sources of motivation and demotivation in college classes. *Communication Education*, *44*(4), 292–306.

Corrallo, S. (1994). *A preliminary study of the feasibility and utility for national policy of instructional good practice indicators in undergraduate education (contractor reports)*. National Center For Higher Education Management Systems, US Department of Education of Education, National Center for Education Statistics. Retrieved from https://files.eric.ed.gov/fulltext/ED372718.pdf.

Erichsen, E. A., & Bolliger, D. U. (2011). Towards understanding international graduate student isolation in traditional and online environments. *Educational Technology Research and Development*, *59*(3), 309–326.

Estepp, C. M., & Roberts, T. G. (2015). Teacher immediacy and professor/student rapport as predictors of motivation and engagement. *NACTA Journal*, *59*(1), 155–163.

Frisby, B. N., & Martin, M. M. (2010). Instructor-student and student-student rapport in the classroom. *Communication Education*, *59*(2), 146–164. https://doi.org/10.1080/03634520903564362.

Glascock, J., & Ruggiero, T. E. (2006). The relationship of ethnicity and sex to professor credibility at a culturally diverse university. *Communication Education*, *55*(2), 197–207. https://doi.org/10.1080/03634520600566165.

Gorham, J. (1988). The relationship between verbal teacher immediacy behaviors and student learning. *Communication Education*, *37*(1), 40–53.

Gorham, J., & Christophel, D. M. (1990). The relationship of instructors' use of humor in the classroom to immediacy and student learning. *Communication Education*, *39*(1), 46–62. https://doi.org/10.1080/03634529009378786.

Gunawardena, C. N., & Jung, I. (2014). Perspectives on culture and online learning. In I. J. Jung, & C. N. Gunawardena (Eds.), *Culture and online learning: global perspectives and research*, (pp. 1–14). Sterling: Stylus.

Hampton, M. M. (2018). Designing for immediacy and culture. In K. L. Milheim (Ed.), *Cultivating diverse online classrooms through effective instructional design*, (pp. 17–44). Hershey: IGI Global.

Hofstede, G. (1980). *Culture's consequences: international differences in work-related values*. Beverly Hills: Sage Publications.

Hofstede, G., & Hofstede, G. J. (2005). *Cultures and organizations: Software of the mind*, (2nd ed.,). New York: McGraw-Hill.

Johnson, C., Darrow, A., & Eason, B. J. A. (2008). Novice and skilled music instructors' nonverbal behaviors and their relationship to perceived effectiveness and rapport. *Bulletin of the Council for Research in Music Education*, *178*, 73–83.

Kearney, P., Plax, T. G., & Wendt-Wasco, N. J. (1985). Teacher immediacy for affective learning in divergent college classes. *Communication Quarterly*, *33*(1), 61–74.

Kop, R. (2011). The challenges to connectivist learning on open online networks: Learning experiences during a massive open online course. *The International Review of Research in Open and Distributed Learning*, *12*(3). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/882.

Kupczynski, L., Ice, P., Wiesenmayer, R., & McCluskey, F. (2010). Student perceptions of the relationship between indicators of teaching presence and success in online courses. *Journal of Interactive Online Learning*, *9*(1), 23–43.

LeFebvre, L., & Allen, M. (2014). Teacher immediacy and student learning: An examination of lecture/laboratory and self-contained course sections. *Journal of the Scholarship of Teaching and Learning*, *14*(2), 29–45.

Liu, X., Liu, S., Lee, S., & Magjuka, R. J. (2010). Cultural differences in online learning: International student perceptions. *Educational Technology & Society*, *13*(3), 177–188.

McArthur, J. A., & Bostedo-Conway, K. (2012). Exploring the relationship between student-instructor interaction on twitter and student perceptions of teacher behaviors. *International Journal of Teaching and Learning in Higher Education*, *24*(3), 286–292.

Mehrabian, A. (1966). Attitudes in relation to the forms of communicator-object relationship in spoken communications. *Journal of Personality*, *34*(1), 80–93.

Mehrabian, A. (1971). *Silent messages*. Belmont: Wadsworth.

Muuro, M., Wagacha, W., Oboko, R., & Kihoro, J. (2014). Students' perceived challenges in an online collaborative learning environment: A case study of higher learning institutions in Nairobi, Kenya. *The International Review of Research in Open and Distance Learning.*, *15*(6), 132–161.

Myers, S. A., Zhong, M., & Guan, S. (1998). Instructor immediacy in the Chinese college classroom. *Communication Studies*, *49*(3), 240–254.

Nunn, S. G., Brown-Joseph, L., & Hill, M. S. (2017). Foundational theories of social media tools and cultural competency. In A. D. Benson, R. Joseph, & J. L. Moore (Eds.), *Culture, learning, and technology: research and practice*, (pp. 127–150). New York: Routledge.

Pace, C. R. (1990). *The undergraduates: a report of their activities and progress in college in the 1980s*. Los Angeles: Center for the Study of Evaluation, University of California, Los Angeles.

Palermo-Kielb, K., & Fraenza, C. (2018). Bridging the social, academic, and cultural divide for international students: using peer-to-peer support strategies online. In K. L. Milheim (Ed.), *Cultivating diverse online classrooms through effective instructional design*, (pp. 87–115). Hershey: IGI Global.

Park, H. S., Lee, S. A., Yun, D., & Kim, W. (2009). The impact of instructor decision authority and verbal and nonverbal immediacy on Korean student satisfaction in the US and South Korea. *Communication Education*, *58*(2), 189–212. https://doi.org/10.1080/03634520802450531.

Powell, G. C. (1997). On being a culturally sensitive instructional designer and educator. *Educational Technology*, *37*(2), 6–14.

Richmond, V. P., Gorham, J. S., & McCroskey, J. C. (1987). The relationship between selected immediacy behaviors and cognitive learning. In M. McLaughlin (Ed.), *Communication yearbook*, (vol. 10, pp. 574–590). Beverly Hills: Sage Publications.

Roberts, A., & Friedman, D. (2013). The impact of teacher immediacy on student participation: An objective cross-disciplinary examination. *International Journal of Teaching and Learning in Higher Education*, *25*(1), 38–46.

Rodney, S. E. (2002). The integration of instructional technology into public education: Promises and challenges. *Educational Technology*, *42*(1), 5–13.

Rovai, A. P., Baker, J. D., & Ponton, M. K. (2013). *Social science research design and statistics*. Chesapeake: Watertree Press.

Rovai, A. P., & Barnum, K. T. (2003). Online course effectiveness: An analysis of student interactions and perceptions of learning. *Journal of Distance Education*, *18*(1), 57–73.

Rovai, A. P., Wighting, M. J., Baker, J. D., & Grooms, L. D. (2009). Development of an instrument to measure perceived cognitive, affective, and psychomotor learning in traditional and virtual classroom higher education settings. *Internet and Higher Education*, *12*(1), 7–13.

Rucker, M. L., & Gendrin, D. M. (2003). The impact of ethnic identification on student learning in the HBCU classroom. *Journal of Instructional Psychology*, *3*(*30*), 207–215.

Sadykova, G. (2014). Mediating knowledge through peer-to-peer interaction in a multicultural online learning environment: a case of international students in the US. *The International Review of Research in Open and Distributed Learning*, *15*(3) Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1629/2898.
Sadykova, G., & Dautermann, J. (2009). Crossing cultures and borders in international online distance higher education. *Journal of Asynchronous Learning Networks*, *13*(2), 89–114.
Schrodt, P., & Witt, P. L. (2006). Students' attributions of instructor credibility as a function of students' expectations of instructional technology use and non-verbal immediacy. *Communication Education*, *55*(1), 1–20. https://doi.org/10.1080/03634520500343335.
Stork, E., & Hartley, N. T. (2014). Gender and cross-cultural perceptions of professors' behaviors: a comparison of Chinese and American college students. *Contemporary Issues in Education Research*, *7*(2), 95–105.
Subramony, D. P. (2017). Revisiting instructional technologists' inattention to issues of cultural diversity among stakeholders. In A. D. Benson, R. Joseph, & J. L. Moore (Eds.), *Culture, learning, and technology: research and practice*, (pp. 28–43). New York: Routledge.
Thomas, M. K. (2017). Globalization, ironic binaries, and instructional technology: toward the emergence of a robust critical theory of technology. In A. D. Benson, R. Joseph, & J. L. Moore (Eds.), *Culture, learning, and technology: research and practice*, (pp. 44–57). New York: Routledge.
Titsworth, B. S. (2001). The effects of teacher immediacy, use of organizational lecture cues, and students' note-taking on cognitive learning. *Communication Education*, *50*(4), 283–297. https://doi.org/10.1080/03634520109379256.
Walkem, K. (2014). Instructional immediacy in eLearning. *Royal College of Nursing*, *21*(3), 179–184.
Warner, R. M. (2013). *Applied statistics: From bivariate through multivariate techniques*. Los Angeles: Sage.
Wells, M. I., & Dellinger, A. B. (2011). The effect of type of learning environment on perceived learning among graduate nursing students. *Nursing Education Perspectives*, *32*(6), 406–410.
Wilson, J. H., & Locker Jr., L. L. (2008). Immediacy scale represents four factors: nonverbal and verbal components predict student outcomes. *Journal of Classroom Interaction*, *42*(2), 4–10.
Witt, P. L., Wheeless, L. R., & Allen, M. (2004). A meta-analytic review of the relationship between teacher immediacy and student learning. *Communication Monographs*, *71*(2), 184–207. https://doi.org/10.1080/036452042000228054.
Zhang, X., Liu, J., Liu, C., & Cole, M. (2014). Factors influencing users' perceived learning during online searching. In *Proceedings of the 9th International Conference on e-Learning: ICEL 2014*, (p. 200) Academic Conferences Limited.
Zhang, Y. (2013). Power distance in online learning: experience of Chinese learners in U.S. higher education. *The International Review of Research in Open and Distance Learning*, *14*(4), 238–254.