Perceived credibility and effectiveness of college art design courses in a mobile learning system

Wei Meng & Ren-Cheng Zhang

Dhurakij Pundit University
Bangkok, Thailand

ABSTRACT: In this article, the authors present the underlying mechanism of the effectiveness of college art design courses in mobile learning. Specifically, based on the concept of media richness theory and the survey data of 403 art design students in universities, this study shows that the perceived media richness was positively associated with the perceived credibility in mobile learning, thus promoted the effectiveness of learning. Mediation analyses demonstrated that the perceived para-social relationship mediated the association between perceived media richness and perceived credibility in mobile learning. In addition, tests of moderated mediation indicated the direct effects of media richness on para-social relations, and that the indirect effect was stronger for learners with high innovativeness. The results underscore the importance of identifying the underlying processes that affect the mediation between perceived media richness and perceived credibility.

INTRODUCTION

With the development of ICT technology, researchers started to pay increasingly more attention to learning in informal environments. Alrasheedi et al reviewed 30 studies from 2005 to 2013, and their findings indicate that the most critical factor for success was whether students realised that their learning efficiency was improved through mobile learning [1]. Thus, perceived credibility is an important factor in studying the effectiveness of current mobile learning.

According to media richness theory (MRT), face-to-face interactions are the most common [2]. Over the years, art design courses have been neither traditional, applied courses nor pure theoretical courses. However, most of the courses were practical guidance courses, which required face-to-face communication. Therefore, this study made full use of media richness theory to examine new mobile learning resources.

With the development of mobile technology, the network environment of mobile education has changed, and the relationship between teachers and students, and the teaching organisational form has also undergone tremendous changes. College students are formally or informally integrating social media into their learning experiences. In addition, university teachers increasingly use social media to support teaching activities [3]. In this context, to reflect the interpersonal relationship and psychological characteristics of learners participating in mobile learning, this study has combined para-social relationship theory with the characteristics of media richness theory to examine the psychological identity of students in the process of mobile learning.

Compared with other majors in arts and sciences, art design majors have certain distinctiveness and higher requirements in regard to professional capabilities. The proportion of practical teaching in the curriculum setting is usually significant, and there are many extended courses. Apart from formal classroom teaching, these courses need to rely on independent learning in an informal environment as an effective supplement to enhance professional ability. Therefore, this study focused on students majoring in art and design as research subjects as they engage in formal and informal forms of learning. Through the choice of its research subjects, this study aims to contribute to more comprehensive studies on factors affecting mobile education in the context of combining formal and informal education in colleges and universities.

LITERRATURE REVIEW

The theory of media richness can be applied in education to determine whether a particular channel is more effective than other learning environments. In this study, the concept of technology richness refers to a new richness discovered with the development of new ICT. Relevant research suggests that the higher the level of ICT technology, the higher the perception of media richness [4]. The implementation of appropriate learning media improves learning and

understanding [5]. Cable and Yu confirmed that media richness directly affects users' credibility in media [6]. Therefore, it was hypothesised that perceived media richness was positively correlated with students' perceived credibility in the mobile learning system.

Para-social relationship (PSR) is defined as the emotional affinity between humans and media roles in the Internet environment, similar to the face-to-face relationship, but being an illusion of that relationship [8]. Art design courses in colleges include a broad range of subjects, such as product design, art design, animation design, process design, information design, visual communication design, etc, to adapt to changes in the market demand. As indicated earlier, these art design courses have been mostly practical guidance courses, which require face-to-face communication. Some scholars confirmed that media richness features are positively related to the development of para-social relationships between users and robot-assisted learning systems [8].

In view of the above, Hypothesis 1 (H1) has been formulated: perceived media richness is positively related to the para-social relationship of art and design majors in the mobile learning process.

Credibility is the core content of media richness theory. Richer media lead to more positive social judgments, including credibility and ability. Richer media might increase the credibility of their users in relation to the other party in communication [9]. Many previous studies have also proved that the richness of media directly affects the users' credibility in media [6]. The development of communicative relationships might increase credibility by responding to the characteristics of rich media, such as feedback and reducing ambiguity [10].

Although a mobile on-line learning platform is a rich medium, the interaction in mobile learning is usually one-sided. Through the mobile Internet, students know a lot about teachers, and teachers know little about students. The focus of the design and technology subject is still too much on the teacher rather than the student [11]. Therefore, it is pertinent to consider other researchers in the field of social media, such as the views of Munnukka et al who emphasise that para-social experience could be developed with either teachers or students as media roles during or after the learning process [12].

Hence, the following Hypothesis 2 (H2): the para-social relationship is positively correlated with the perceived credibility of art and design majors in the mobile learning process.

Other researchers in media pointed out that the more members of the audience participate, the higher their para-social relationship, because they would be more integrated with the media content, thus increasing their self-investment in that content and strengthening the perceived credibility [12].

This has led to Hypothesis 3 (H3): the para-social relationship perceived by students in mobile learning mediates the relationship between perceived media richness and perceived credibility.

Some experimental studies refer to the operation of *credibility* divided into two parts: trust and ability, and they show that the richness of communication media is positively correlated with the level of trust [13]. Perceived effectiveness is a measure of how users perceive the effectiveness of technology in achieving their goals compared to using other methods [14]. Based on this definition, the authors define perceived effectiveness in mobile learning, as a measure of students' perception of the effectiveness of on-line learning on mobile learning platforms compared with the off-line traditional education. Adaji and Vassileva demonstrated that the perceived credibility of an e-commerce platform positively affects the perceived effectiveness of on-line shoppers [15].

Hence, the following Hypothesis 4 can be put forward (H4): the perceived credibility of mobile learning positively affects the perceived effectiveness of mobile learning.

In a few studies on mobile learning, the innovative characteristics of individuals were regarded as important factors [16]. Innovativeness considered in another study refers to innovation in information technology, so it is defined as the willingness of individuals to try any new information technology [17]. The higher the level of individual innovativeness, the more positive the belief in new technology, because innovators are more willing to adapt to new technologies, they tend to expect high performance in information systems [16]. Innovators are also more confident in their ability to handle and use new technology and can optimise its performance [18]. Agarwal and Prasad theorised that personal innovativeness could moderate the effects of individual users' perceptions of IT on their usage intention [17]. Major courses in art design impose certain requirements on students' innovation ability. In the process of mobile learning, combining students' innovativeness and utilising media richness to improve the efficiency of professional learning, can enhance their confidence in professional learning.

The characteristics of innovativeness, including previous studies, hinted that this personality trait could influence the mediating mechanism of perceived media richness on para-social relationship in mobile learning. However, it was not certain whether the effect would be stronger for people with high or low innovativeness.

Therefore, the authors propose the following research question (RQ1): would the indirect effect of perceived media richness on perceived credibility via para-social relationship be contingent upon personal innovativeness?

In general, the purpose of this study has been divided into three aspects. First of all, this study examined whether para-social relationships could mediate the relationship between perceived media richness and perceived credibility in the process of mobile learning.

Secondly, the study focused on whether perceived credibility would affect the effectiveness of the dynamic process of mobile learning.

Thirdly, the study also tested whether the effect of the mediation was related to the students' personal innovative characteristics. The authors proposed a mediation model (Figure 1), which clarified the relationship between perceived media richness and self-presentation. Namely, how did the media richness perceived by art and design majors affect their perceived credibility in the process of mobile learning? Under what circumstances would the level of perceived credibility be greater?

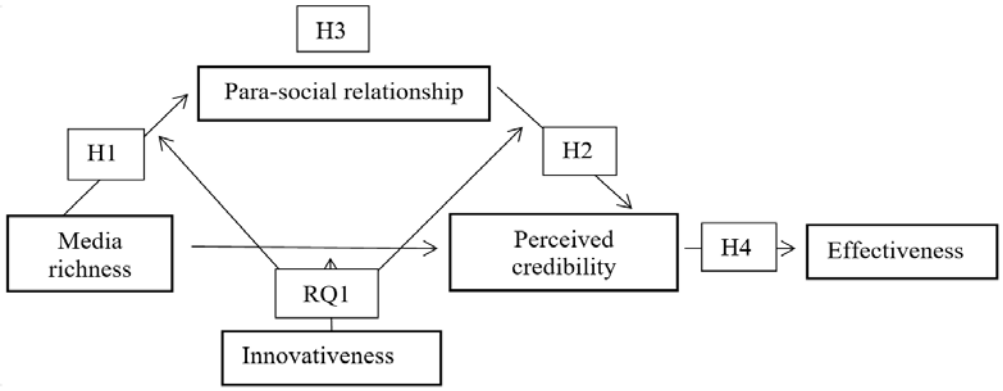

Figure 1: The proposed moderated mediation model.

METHODOLOGY

Participants and Process

The data were collected from art and design majors in three Chinese universities through anonymous on-line surveys in 2020. The selected institutions represented different-level universities in China; namely, provincial key comprehensive universities from the central, western and south-eastern coasts; double first-class comprehensive universities directly under the Ministry of Education; and provincial key professional universities. The survey subjects ranged from first-year undergraduates to graduate students. The sample covered three specific majors: film and television animation, visual communication and media arts.

The criteria for selecting participants included: 1) undergraduate or graduate students at school; 2) experience of using *learning link* or related application to participate in formal courses organised by teachers; and 3) relevant experience of informal learning through mobile application. The sample for this study included 436 students. Based on the questionnaire data generation features, responses from participants whose filling time was less than 30 seconds were excluded from the final sample. There were 403 final qualified participants.

Measuring Tool

The items selected for the construction of this study were adapted and modified from previous studies. Perceived effectiveness is related to performance expectancy, which is defined as *…the degree to which using a technology will provide benefits to consumers in performing certain activities* [14]. This variable was assessed by averaging three adapted items which measured perceived effectiveness of persuasive systems [14]. The three items were assessed on a five-point scale, ranging from: 1 = strongly disagree to 5 = strongly agree (M = 3.68, SD = 0.94, α = 0.85).

In this study, the concept of media richness refers to a new richness discovered with the development of new ICT technology. Five adapted items from the distance education study of Shepherd and Martz were used to measure the characteristics of media richness in mobile learning [19]. A Likert five-point scale was adopted for scoring, where one point means strongly disagree and five points strongly agree (M = 3.39, SD = 0.82, α = 0.83). The PSR variable was measured using a five-item scale adapted from Munnukka et al [12].

The five items were assessed on a five-point scale, ranging from: 1 = strongly disagree to 5 = strongly agree (M = 3.96, SD = 1.12, α = 0.89). Five adapted items from the on-line media study of Munnukka et al were used to measure the perceived credibility in mobile learning [12]. A Likert five-point scale was adopted for scoring, where one point means strongly disagree and five points strongly agree (M = 3.78, SD = 0.82, α = 0.80). The personal innovativeness was measured using five items adapted from Cheng [20]. Again, a Likert five-point scale was adopted for scoring (M = 3.93, SD = 0.77, α = 0.90).

RESULTS

Demographics of Respondents

A total of 403 valid questionnaires were analysed in this study. Among available survey subjects, there were 148 male (36.72%) and 255 female students (63.28%). They were all college students majoring in art and design. The distribution of levels (by grade) was as follows: 119 freshmen (29.53%), 81 sophomores (20.1%), 101 juniors (25.06%), 52 seniors (12.9%), and 50 postgraduates (12.41%). The distribution of usage time (the respondents' experience in mobile learning via mobile devices) was as follows: less than 6 months (25.8%), 6-12 months (25.2%), 13-18 months (16.5%), 19-24 months (18.6%) and more than 24 months (13.9%). In terms of the tendency of respondents to adopt the form of mobile learning, 269 (66.75%) download apps to learn, 59 (14.64%) use WeChat public account or WeChat mini-program for mobile learning, and 75 (18.61%) prefer WeChat or QQ for mobile learning. The demographics of respondents are shown in Table 1.

Table 1: Descriptive statistics analysis of the formal questionnaire.

Background variable	Category	Number	Proportion
Gender	Male	148	36.72%
	Female	255	63.28%
Grade	Freshman	119	29.53%
	Sophomore	81	20.10%
	Junior	101	25.06%
	Senior	52	12.90%
	Postgraduates	50	12.41%
Experience	Less than 6 months	104	25.80%
	6 to 12 months	102	25.20%
	13 to 18 months	66	16.50%
	19 to 24 months	75	18.60%
	More than 24 months	56	13.90%
Form	App	269	66.75%
	WeChat official accounts and mini apps	59	14.64%
	WeChat and QQ	75	18.61%

Confirmatory Factor Analysis

To determine the dimensionality of the outcome variables, a confirmatory factor analysis (CFA) was conducted based on the hypothesised five-factor model. The five items selected for personal innovativeness, the five items for perceived media richness, the five items for para-social relationship, the five items for perceived credibility, and the three items for perceived effectiveness were submitted to a confirmatory factor analysis, which specified a five-factor structure. In addition, a common method bias (CMB) test was required. Harman's single-factor test using the CFA method could evaluate the common method bias. The CFA was used to test the fit degree of the single-factor model (all items were loaded on one factor) and the five-factor model.

The results showed that the index of a suitable single-factor model [$\chi 2 = 2602.423$, df = 405, $\chi 2/df = 6.426$, $p < 0.001$, goodness-of-fit index (GFI) = 0.620, normalised fit index (NFI) = 0.838, Tucker-Lewis index (TLI) = 0.849, comparative fit index (CFI) = 0.860, and the root mean square error of approximation (RMSEA) = 0.117] was not as good as the fit index of the five-factor model ($\chi 2 = 518.308$, $\chi 2/df = 2.436$, $p < 0.001$, GFI = 0.912, NFI = 0.932, TLI = 0.963, CFI = 0.969, RMSEA = 0.055), based on the criteria recommended by Byrne [21]. It could be seen that the fit of the single-factor model was much worse than that of the five-factor model, which indicated that the common method bias in this study was not a problem.

Verification of the Structural Model

The next step was to test the structural model of the research model depicted in Figure 2. The overall fit index of the structural model is: $\chi 2 = 299.817$, df = 94, $\chi 2/df = 2.438$, $p < 0.001$, GFI = 0.902, NFI = 0.911, TLI = 0.954, CFI = 0.932, RMSEA = 0.073. According to the relevant rules in previous studies, the analysis results showed that the fit index of the structural model was better than expected. The causal coefficient in the regression model showed that media richness had a significant impact on para-social relationships (regression coefficient $\beta = 0.727$; absolute t value = 10.747; $p < 0.01$), thus it could be seen that the H1 Hypothesis was supported. Para-social relations had a significant impact on perceived credibility (regression coefficient $\beta = 0.370$; the absolute t value = 3.380; $p < 0.01$), so the H2 Hypothesis was also proved. Meanwhile, the impact of perceived credibility on perceived effectiveness was significant (regression coefficient $\beta = 0.690$; absolute t value = 9.373; $p < 0.01$), assuming H4 was supported. Figure 2 presents the properties of the causal paths, including standardised path coefficients and t-statistics explained variance for each equation in the hypothesised model.

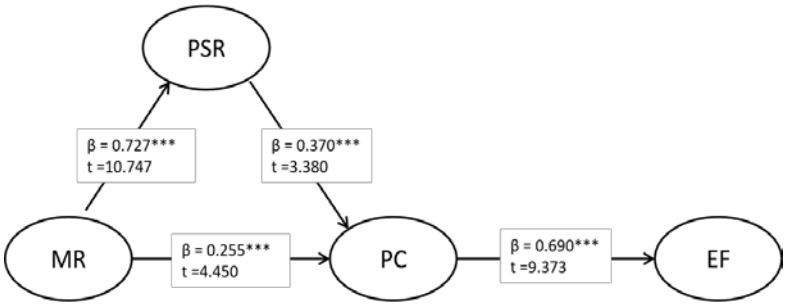

Figure 2: Model testing results (PC - perceived credibility; MR - media richness; PSR - para-social relationship; and EF - effectiveness).

The effect of perceived credibility on effectiveness was consistent with the findings of previous technology adoption studies [22][23]. It could be seen that the surveyed students majoring art and design in colleges and universities had a strong perceived credibility during the mobile learning process, which would bring them a stronger perception of effectiveness.

The survey results supported the positive relationship between para-social relationships and perceived credibility, which is consistent with the findings of Munnukka et al [12]. Thus, when students experience a good interactive relationship in the process of mobile learning and establish a stable para-social relationship between teachers and themselves, the students' perceived credibility in mobile course learning would increase, leading to a higher participation in learning. The results of this study supported that media richness directly affects students' credibility, which is consistent with the findings of Cable and Yu [6]. It was confirmed that the use of richer media might cause students to have a greater degree of credibility in mobile learning.

The results of this study supported the positive relationship between perceived media richness and para-social relations, which is in accordance with the findings of other studies [8][22]. The current research validated the premise that higher media richness was related to the formation of more stable para-social relationships. For the teaching needs of art and design majors, face-to-face interaction was not only one of the basic characteristics of mobile learning systems, but also an indispensable perception function for professional course learning.

Testing for Mediation Effect

Hypothesis 3 predicted that para-social relationship would mediate the relationship between perceived media richness and perceived credibility in mobile learning. From the regression analyses it can be seen that, in the first step, perceived media richness was significantly associated with perceived credibility, b = 0.870, $p < 0.001$ (see Model 1 in Table 2). In the second step, perceived media richness was significantly associated with para-social relationship, b = 0.844, $p < 0.001$ (see Model 2 in Table 2). In the third step, when the study controlled perceived media richness, para-social relationship was significantly associated with perceived credibility in mobile learning, b = 0.373, $p < 0.001$ (see Model 3 in Table 2), supporting Hypothesis 2. Lastly, the procedure of bias-corrected percentile bootstrap showed that the indirect effect of perceived media richness on perceived credibility in mobile learning through para-social relationship was significant, ab = 0.316, se = 0.058, 95% CI = [0.207, 0.438]. Perceived media richness and para-social relationship predict a significant portion of variability in perceived credibility in mobile learning, R2 = 0.25, $p < 0.001$. From the results it can be stated that the four criteria for building up mediation effect were fulfilled. Therefore, Hypothesis 3 was supported.

Table 2: Testing the mediation effect of perceived media richness on perceived credibility in mobile learning.

Predictors	Model 1 (PC)		Model 2 (PSR)		Model 3 (PC)	
	b	*t*	b	*t*	b	*t*
Gender	0.047	1.162	-0.051	-1.550	0.066	1.815
Grand	0.010	1.218	0.022	1.718*	0.001	0.078
Major	0.002	0.633	0.012	0.521	-0.003	-0.102
Experience	0.016	0.074	0.001	0.119	0.015	1.186
MR	0.870	9.502***	0.844	9.536***	0.560	7.869***
PSR					0.373	6.858***
R^2	0.232		0.224		0.250	
F	21.067***		24.946***		23.690***	

PC - perceived credibility; MR - media richness; PSR - para-social relationship; each column illustrates a regression model that predicts the criterion at the top of the column; gender was dummy coded such that 0 = female and 1 = male; *p < 0.05, **p < 0.01, ***p < 0.001

This study confirmed the proposed indirect influence mechanism, which indicated that the para-social relationship mediated the relationship between perceived media richness and perceived credibility in mobile learning. It was also

confirmed that the development of social relations might lead to increased credibility and decreased ambiguity by responding to the features of rich media as feedback [10]. The more the audience members participated, the higher their para-social relationship would be, because they would be more integrated with media content, thereby increasing their self-investment in media content, thereby enhancing perceived credibility [12]. Hence, this study is consistent with the already-mentioned previous research. Based on the constructed model, the authors found that the media richness characteristics of mobile learning systems often helped to increase the interaction between teachers and students in the process of mobile learning. The existence of a para-social relationship helped students build up their perceptual credibility in teachers and courses, thus affecting their effectiveness in mobile learning.

The Moderating Effect of Personal Innovativeness

Another important question in this study was whether the impact of perceived media richness on perceived credibility in mobile learning would be adjusted by individual creativity through PSR. In order to answer this research question, the parameters of the three regression models proposed by Hayes, PROCESS macro (Model 59) were applied after evaluation [24]. The detailed parameters of the three models are shown in Table 3.

Table 3: Testing moderated mediation effect of perceived media richness on perceived credibility.

Predictors	Model 1 (PC)			Model 2 (PSR)			Model 3 (PC)	
	b	*t*		b	*t*		b	*t*
Gender	0.017	0.551		0.009	0.353		0.015	0.480
Grade	0.026	1.956		0.000	0.059		0.026	2.035
Experience	-0.004	-0.477		-0.015*	-2.121		-0.002	-0.222
Form	0.002	0.112		-0.004	-0.271		0.002	0.128
MR	0.601	16.803***		0.605***	19.842		0.431***	9.320
PI	0.284	8.011***		0.332***	10.967		0.193***	5.038
MR×PI	0.028	1.217		0.067***	3.327		0.070	1.035
PSR							0.280***	5.572
PSR×PI							-0.064	-0.942
R^2	0.195			0.257			0.238	
F	22.343***			29.466***			21.945***	

PC - perceived credibility; MR - media richness; PSR - para-social relationship; PI - personal innovativeness; each column illustrates a regression model that predicts the criterion at the top of the column; *p < 0.05, **p < 0.01, ***p < 0.001

As could be seen from Table 3, Model 1 showed that perceived media richness had a significant main effect on perceived credibility, b = 0.601, $p < 0.001$, which was not moderated by personal innovativeness, b = 0.028, $p > 0.05$. From Model 2, it could be seen that perceived media richness had a significant impact on para-social relationships, b = 0.605, $p < 0.001$, and more importantly, this relationship was moderated by personal innovativeness b = 0.067, $p < 0.05$. Finally, as shown in Model 3, para-social relationship in mobile learning had a significant main effect on perceived credibility b = 0.280, $p < 0.05$, and this effect was not moderated by personal innovativeness, b = -0.064, p > 0.05.

Base on the results, the authors have drawn a relationship diagram between the predicted perceived media richness and para-social relationships (Figure 3), which have high and low levels of innovative personality characteristics. The simple and clear slope test suggested that for the participants with high innovation rates, the perceived media richness had a more significant and stronger influence on the perception and formation of para-social relationships.

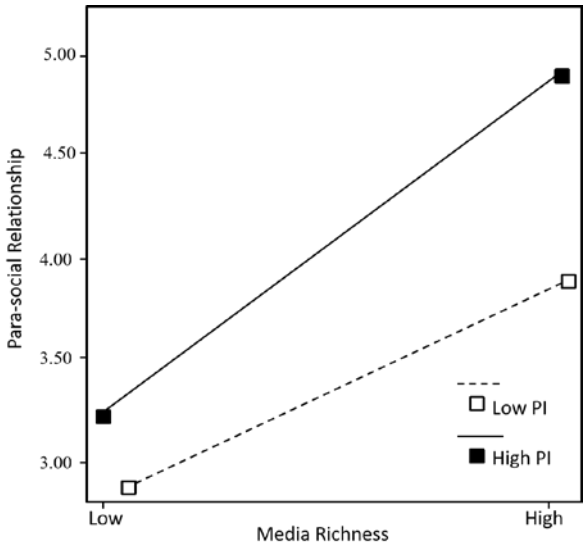

Figure 3: Effects of media richness by PI paths interaction on para-social relationships.

A more important finding of this study is that it theoretically demonstrated the moderating effect of personal innovation traits on the indirect correlation between media richness and perceived credibility through social transformation. The research results showed that innovativeness moderated the path of media richness and para-social relationship, establishing the first stage of moderation model, in a type of moderated mediation. This finding indicated that the para-social relationship was an important intermediary in the research model, and the intermediary path from the media richness to the stage of para-social relations depended on the individual's degree of innovation, which had a greater impact on those with a higher degree of innovation.

The results showed that when students with a high innovation level perceived more media richness features (i.e. mobile learning systems were easy to use, interactive and rich in content), they would be more likely to establish para-social relationships between teachers and themselves than students with a low level of innovation. In other words, students with a high level of innovation could more accurately and directly perceive the teacher's professional level and the effectiveness of teaching content through media richness characteristics, enabling them to establish the corresponding teacher-student interaction. This study also echoed the previous relevant research results: in the process of using mobile learning, learners with strong personal innovation ability paid more attention to the perceived usefulness of mobile learning [20].

The relationship between the para-social relationship and perceived credibility in the second half of the intermediate model was not regulated by individual innovation traits. It could be seen that the established para-social relationship between teachers and students was not affected by personal innovativeness in the formation of students' perceived credibility. Therefore, in the process of teaching mobile courses for art and design majors, it is necessary for teachers to pay more attention to the establishment of good self-endorsement and create a good teacher-student relationship within the network environment by continuously improving professional abilities and teaching methods.

CONCLUSIONS

This study examined the impact of external and internal factors on the perceived credibility and perceived effectiveness of college students (including undergraduates and postgraduates) in mobile curriculum learning. More specifically, this study adopted a moderate meditation model to focus on the external role of media richness and para-social relationships of art and design majors in the process of mobile learning, as well as the intrinsic role of innovative personality traits in this process.

It was found that para-social relations regulated the relationship between perceived media richness and perceived credibility in the process of mobile learning, which had a positive impact on the effectiveness of learning. In addition, the results showed that in the first stage of the meditation model, the meditation was adjusted by personal innovativeness, which demonstrated that the path from the perception of media richness to para-social relationship was stronger for the innovative individuals.

REFERENCES

1. Alrasheedi, M., Capretz, L.F. and Raza, A., A systematic review of the critical factors for success of mobile learning in higher education (university students' perspective). *J. of Educational Computing Research*, 52, **2**, 257-276 (2015).
2. Daft, R.L. and Lengel, R.H., Organizational information requirements, media richness and structural design. *Manage. Science*, 32, **5**, 554-571 (1986).
3. Kuswandi, D., Effect of a flipped mastery classroom strategy assisted by social media on learning outcomes of electrical engineering education students. *World Trans. on Engng. and Technol. Educ.*, 17, **2**, 192-196 (2019).
4. Illia, A. and A. Lawson-Body, *ICT use: The influence of cultural dimensions on the need for media richness and technological richness. Information Systems*, VIII, **2**, 171-177 (2007).
5. Elmunsyah, H., Hidayat, W.N., Asfani, K. and Kusumadyahdewi, Mobile app-based learning media to facilitate student learning. *World Trans. on Engng. and Technol. Educ.*, 17, **1**, 88-92 (2019).
6. Cable, D.M. and Yu, K.Y.T., Managing job seekers' organizational image beliefs: the role of media richness and media credibility. *J. of Applied Psychology*, 91, **4**, 828-840 (2006).
7. Horton, D. and Wohl, R.R., Mass communication and para-social interaction. *Psychiatry: J. for the Study of Interpersonal Processes*, 19, 215-229 (1956).
8. Yoo, H., Kwon, O. and Lee, N., Human likeness: cognitive and affective factors affecting adoption of robot-assisted learning systems. *New Review of Hypermedia and Multimedia*, 22, **3**, 169-188 (2016).
9. Cho, C.H, Phillips, J.R., Hageman, A.M. and Patten, D.M., Media richness, user trust, and perceptions of corporate social responsibility. *Accounting, Auditing & Accountability J*., 22, **6**, 933 (2009).
10. Koert, R., E-media in development: combining multiple e-media types (originally published in February 2003). *First Monday*, October (2007).
11. Šuligoj, V. and Ferk Savec, V., The relationship of students' attitudes to technology and their creative ability. *World Trans. on Engng. and Technol. Educ.*, 16, **3**, 243-248 (2018).
12. Munnukka, J., Maity, D., Reinikainen, H. and Luoma-aho, V., *Thanks for watching.* The effectiveness of YouTube vlogendorsements. *Computers in Human Behavior*, 93, 226-234 (2019).

13. Burgoon, J.K., Bonito, J.A., Ramirez, A. Jr., Dunbar, N.E., Kam, K. and Fischer, J., Testing the interactivity principle: effects of mediation, propinquity, and verbal and nonverbal modalities in interpersonal interaction. *J. of Communic.*, 52, **3**, 657-677 (2002).
14. Lehto, T. and Oinas-Kukkonen, H., Explaining and predicting perceived effectiveness and use continuance intention of a behaviour change support system for weight loss. *Behaviour & Infor. Technol.*, 34, **2**, 176-189 (2015).
15. Adaji, I. and Vassileva, J., Perceived effectiveness, credibility and continuance intention in e-commerce: a study of Amazon. *Proc. Inter. Conf. on Persuasive Technol*., Springer (2017).
16. Turan, A., Tunç, A.Ö. and Zehir, C., A theoretical model proposal: personal innovativeness and user involvement as antecedents of unified theory of acceptance and use of technology. *Procedia - Social and Behavioral Sciences*, 210, 43-51 (2015).
17. Agarwal, R. and Prasad, J., A conceptual and operational definition of personal innovativeness in the domain of information technology. *Infor. Systems Research*, 9, **2**, 204-215 (1998).
18. Lin, Z. and Filieri, R., Airline passengers' continuance intention towards online check-in services: the role of personal innovativeness and subjective knowledge. *Transportation Research Part E: Logistics and Transportation Review*, 81, 158-168 (2015).
19. Shepherd, M.M. and Martz, W.B., Media richness theory and the distance education environment. *J. of Computer Infor. Systems*, 47, **1**, 114-122 (2006).
20. Cheng, Y.-M., Exploring the intention to use mobile learning: the moderating role of personal innovativeness. *J. of Systems and Infor. Technol.*, 16, **1**, 40-61 (2014).
21. Byrne, B.M., Structural equation modeling with AMOS, EQS, and LISREL: comparative approaches to testing for the factorial validity of a measuring instrument. *Inter. J. of Testing*, 1, **1**, 55-86 (2001).
22. Sokolova, K. and Kefi, H., Instagram and YouTube bloggers promote it, why should I buy? How credibility and parasocial interaction influence purchase intentions. *J. of Retailing and Consumer Services*, 53 (2020).
23. Gupta Kriti, P., Manrai, R., and Goel, U., Factors influencing adoption of payments banks by Indian customers: extending UTAUT with perceived credibility. *J. of Asia Business Studies*, 13, **2**, 173-195 (2019).
24. Hayes, A.F., *Introduction to Mediation, Moderation, and Conditional Process Analysis: a Regression-Based Approach*. Guilford Publications (2017).

Appendix A: Construct Measurement and Sources

Construct	Item	Measure	Source - reference
Media richness	MR1	Mobile learning allows me to express my feelings fully.	[19]
	MR2	Mobile learning allows me to freely say what I intend to say.	
	MR3	Mobile learning allows me to explain complex/difficult ideas well.	
	MR4	Mobile learning allows me to use multiple cues (e.g. text, audio, visual).	
	MR5	Mobile learning gives me a feel of face-to-face communication.	
Para-social relationship	PSR1	Mobile learning makes me feel comfortable, and I feel that my teachers and classmates are friends.	[12]
	PSR2	I would like to meet the teachers and other students behind the mobile course.	
	PSR3	I trust the teacher of mobile learning course, when he recommends the information beyond the course to me, I will accept it.	
	PSR4	The interaction between teachers and students in the mobile learning environment is similar to that in the real world.	
	PSR5	I like mobile learning in my personal space.	
Perceived credibility	PC1	I feel the teacher was honest.	[12]
	PC2	I consider the teacher trustworthy.	
	PC3	I consider the teacher earnest.	
	PC4	I feel the teacher is an expert and knows a lot about the major.	
	PC5	The teacher and I have a lot in common.	
Effectiveness	EF1	In my opinion, using the mobile learning system has an effect on my study.	[14]
	EF2	My chances of learning improve by using the mobile learning system.	
	EF3	Using the mobile learning system is straightforward for me.	
Personal innovativeness	PI1	If I hear about a new IT, I will look for ways to experiment with it.	[20]
	PI2	Among my peers, I am usually the first to try out new information technologies.	
	PI3	In general, I am not hesitant to try out new information technologies.	
	PI4	I like to experiment with new information technologies.	
	PI5	I hope to get personalised learning experience in mobile learning.	