

ASCILITE 2023

People, Partnerships and Pedagogies

Explaining persistence in online learning: A review study

Hai Min Dai¹, Kaige Ni¹, Natasha Anne Rappa², Xin Long¹, Chenggang Wu³, Yan Wang⁴, Timothy Teo⁵ and Meng Zhang⁶

¹ Shanghai Jiao Tong University, ² Murdoch University, ³ Shanghai International Studies University, ⁴ Beijing Normal University, ⁵ The Chinese University of Hong Kong, ⁶ Sichuan International Studies University

Learners' persistence in online learning plays a crucial role in achieving successful learning outcomes. In an effort to understand the underlying psychological mechanism of learners' persistence in such environments, a systematic review is conducted to synthesise the existing knowledge. This concise paper presents three fundamental findings derived from the review project, namely, mapping the current research landscape, exploring the motivations propelling researchers to investigate this phenomenon, and examining the theoretical models employed in literature to explain learners' behaviours.

Keywords: persistence, online learning, systematic review

Introduction

Online learning has emerged as a feasible alternative to supporting education during critical situations such as the pandemic. However, the high dropout rate has been extensively documented and investigated as a major hindrance to students' success in online learning. The extant reviews have identified certain factors that either facilitate or hinder learning persistence in online learning. However, these reviews were not sufficiently systematic and comprehensive in terms of addressing the topic of online learning persistence, as their search strategies were tailored to other research objectives. For instance, Kennedy's review study (2014) focused on MOOC characteristics, and the review by Ng (2019) investigated student motivation in open and distance education. Furthermore, these reviews (e.g., Hart, 2012; Lee & Choi, 2010; Paton et al., 2018) failed to encompass the scholarship on online learning persistence in K-12 education and during the pandemic. This omission poses a risk to the currency of the review and its ability to inform current practices in the field. To fill these literature gaps and understand learners' psychological processes underlying their decision to either persist in or drop out from online learning, the present study conducted a systematic review to synthesise the accumulated knowledge on this phenomenon. This concise paper reports three key findings from this review project.

Methods

A thorough literature search was performed across four academic databases, namely Scopus, WOS, ERIC, and ProQuest. Types of online learning and their synonyms were utilised as search words, including "web-based learning", "e-learning", "online learning", "online programs", "e-programs", "distance education", "blended learning", "virtual learning", and "MOOC". Additionally, synonyms and antonyms for "persistence", such as "retention", "completion", and "continuance" were also employed as search terms. The search timeframe was defined as spanning from 1990 to 2022. As a result of this search strategy, a total of 3,793 records were identified. Only studies conducted within educational settings that specifically investigate learners' persistence or dropout from online learning environments were considered for inclusion in this review. Following a rigorous screening process based on the predetermined eligibility criteria, a total of 208 empirical studies were retained for further analysis. Content analysis was adopted as the data analysis technique to synthesise the information extracted from the included studies.

Results

Mapping the Extant Knowledge Base

The article pool (n = 208) included 194 journal articles (published in 100 journals) and 14 conference papers. The following five journals together published more than 50 articles across the years, with the journal *Computers & Education* being the first to publish research on the topic: *International Review of Research in Open and Distributed Learning* (n = 14); *Computers & Education* (n = 12); *Interactive Learning Environments* (n = 9); *Computers in Human Behavior* (n = 9); *Education and Information Technologies* (n = 7).

Most research was coauthored by two or more researchers, with only 37 articles published by single authors. Prolific authors included: Yung-Ming Cheng (n = 7, Taiwan); Young Ju Joo (n = 5, Korea); Chao-Min Chiu (n = 4, Taiwan); and Zhen Shao (n = 4, China).

Reasons for Investigating Online Learning Persistence

Against a common background that technological advances have empowered online learning to become an established or alternative learning mode alongside on-site education, the included studies were initiated for various reasons. A content analysis of the background information extracted from the articles identified eight distinct reasons driving these research efforts (see Table 1).

Table 1 Reasons to Investigate Online Learning Persistence

No.	Reasons	No. of articles
1	Dropout from online learning being more severe than that for on-campus courses	26
2	Dropout incurring cost	13
3	Dropout damaging students' learning	19
4	Dropout eroding institutions' reputation	6
5	The impact of Covid-19	11
6	Dropout threatening online learning's sustainability	7
7	Seeking for diversity in research parameters	52
8	Authors' interest in specific theoretical constructs	20

Note. Studies usually reported multiple reasons.

Many researchers were driven to examine online learning persistence, as it has been consistently observed that online courses/programmes experience higher dropout rates than their campus-based counterparts (see Table 1). Studies were also conducted because learners' early withdrawal from online learning might incur costs for multiple stakeholders: a) Institutions invest significant resources in teaching faculty, facilities (Cochran et al., 2014), and online learning systems (Chow & Shi, 2014), making it wasteful when learners drop out of courses. Additionally, from a business standpoint, investigating learning persistence becomes a valuable topic for institutions, because acquiring new customers/learners is costlier than retaining existing ones (Chiu & Wang, 2008); b) Dropping out of online courses entails losses in terms of finances, time and effort for learners. This is particularly significant in high-stake educational endeavours, such as in an online PhD program, students' discontinuance might burden their families financially (Lee et al., 2020).

Research efforts were also spurred by researchers' concerns regarding the detrimental impact of high dropout rates on students (n=19), including affecting their educational achievement (Yasmin, 2013); diminishing students' confidence in learning, leading to failure and social isolation (Lakhal & Khechine, 2021); and disrupting the learning experience of remaining students and damaging their morale (Nistor & Neubauer, 2010). Besides, some researchers mentioned that high dropout rates would erode institutions' reputation, brand, and image as it reflected negatively on their performance standards, further affecting their future funding from governments (Netanda et al., 2019). The high dropout rates might also hinder the profitability and development of online learning education, thereby posing a threat to its sustainability. The advent of the COVID-19 pandemic in 2020 has further heightened the need for effective online learning and the importance of research on online learning persistence.

As online learning garners increasing acceptance, it has opened up opportunities for researchers to pursue diversity in their research parameters. Specifically, scholars have shown interest in exploring under-researched countries, new learning content, and novel learner demographics (n = 52) (see Table 2). This particular motivation has gained increasing prominence in recent years. Another discernible trend within the included studies is that a growing number of studies are driven by authors' inquisitiveness to investigate the roles of specific theoretical constructs in influencing learning persistence.

Table 2 Examples of Research Efforts to Seek New Research Parameters

Countries	US-affiliated Pacific Islands (Rao & Giuli, 2010) Sub-Saharan Africa (Mwenje & Kasowe, 2013)
------------------	---

	Zimbabwe (Rudhumbu, 2021) The Philippines (Magsayo, 2022)
Learning contents	Online EdD programs (Rockinson-Szapkiw et al., 2016) Parenting intervention (Dadds et al., 2019) Social work master's degree (Detres et al., 2020)
Learner demographics	College student-athlete (Nichols & Levy, 2009) Students with disabilities (Stewart et al., 2013) Employees of public organisations (Pereira et al., 2015) Military student populations (Volk et al., 2020) Medical professionals (Cheng, 2022) Minority or vulnerable learners at a community college (Edmunds et al., 2021)

Models Explaining Online Learning Persistence

To explain online learning persistence, over two-thirds ($n = 141$) of the included studies employed a theory-driven approach in their research design. These studies drew upon theories predominantly rooted in the research fields of management of information systems, education, and psychology. Among these, the Expectation Confirmation Model (ECM) (Bhattacharjee, 2001) and the Technology Acceptance Model (TAM) (Davis, 1989) were the most frequently used baseline models.

The full model or part of the ECM was selected and tested in 34 studies, and 22 studies opted to test the full or partial TAM. Figure 1 displays the test results regarding the paths in these two models, respectively. Among the proposed paths in these two models, the two paths in ECM associated with satisfaction (satisfaction \rightarrow Continuance Intention & Confirmation \rightarrow Satisfaction) were most commonly tested in the included studies. On the other hand, the formation of learners' attitudes (PEU \rightarrow Attitude & PU \rightarrow Attitude) in TAM received the least attention from scholars. Based on the statistics presented in Figure 1, the majority of the studies provided support for the validity of both models in explaining learning persistence. However, it is worth noting that ECM was more frequently adopted in this literature body compared to TAM. Some researchers have put forth the argument that TAM primarily focuses on the initial adoption of online learning, and it may not adequately address the acceptance-discontinuance anomaly (Dai et al., 2020). This perspective could explain the relatively lower usage of TAM compared to ECM in the examined studies.

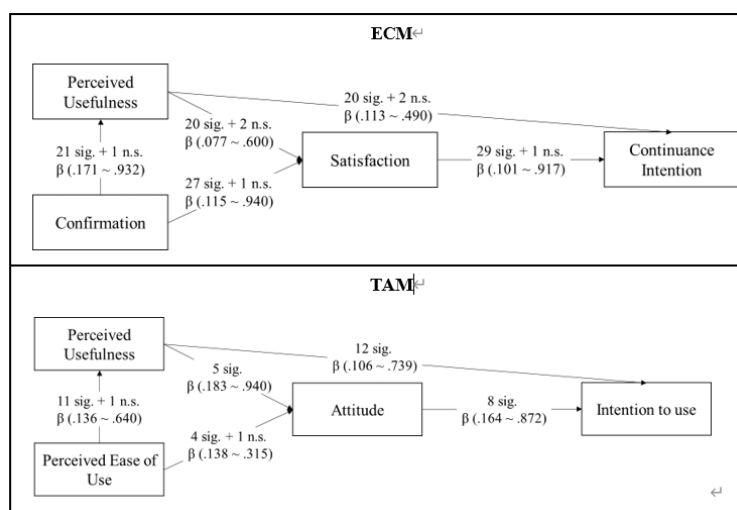


Figure 1: Test results of ECM and TAM

Note. sig: significant result; 29 sig.: 29 studies reporting significant results; n.s.: non-significant results; 1 n.s.: one study reporting insignificant results. The number of studies presented in the figures was less than 34 for ECM and 22 for TAM, which is due to the fact that some studies only adopted part of the models in their studies.

Conclusion and discussion

To optimise the online learning experience and promote online learning outcomes, the present review synthesises the research findings regarding the underlying mechanisms influencing learners' persistence in

online learning. The analysis of the included studies reveals that journal articles were the primary research output format in this research body. Similar to other research fields (Thelwall & Mafrahi, 2022), the research of online learning persistence has experienced continuous growth in co-authorship. In addition, researchers were driven by diverse reasons when investigating online learning persistence. An increasing number of researchers stated that the studies on learning persistence were motivated by their interest in new research parameters including under-researched countries, new learner demographics and learning contents. Seeking diversity is a prominent trend identified from the content analysis of the background information of the included studies. Lastly, ECM and TAM were the most commonly adopted theoretical baseline models in these studies. A majority of the included studies reported significant and positive associations for the paths proposed in the two models, supporting their validity in explaining online learning persistence. However, the strength of the associations, indexed by the values of β , is dispersed. Further research needs to explore the underlying reasons for such variations. In addition, future studies are also encouraged to confirm whether the model structure and contextual features are potential contributing factors for those insignificant results reported in the studies.

References

- Bhattacharjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, 25(3), 351-370. <https://doi.org/10.2307/3250921>
- Cheng, Y. M. (2022). Can tasks and learning be balanced? A dual-pathway model of cloud-based e-learning continuance intention and performance outcomes. *Kybernetes*, 51(1), 210-240. <https://doi.org/10.1108/k-07-2020-0440>
- Chiu, C. M., & Wang, E. T. G. (2008). Understanding web-based learning continuance intention: The role of subjective task value. *Information and Management*, 45(3), 194-201. <https://doi.org/10.1016/j.im.2008.02.003>
- Chow, W. S., & Shi, S. (2014). Investigating students' satisfaction and continuance intention toward e-learning: An extension of the expectation-confirmation model. *Procedia-Social and Behavioral Sciences*, 141, 1145-1149. <https://doi.org/10.1016/j.sbspro.2014.05.193>
- Cochran, J., Campbell, S., Baker, H., & Leeds, E. (2014). The role of student characteristics in predicting retention in online courses. *Research in Higher Education*, 55(1), 27-48. <https://doi.org/10.1007/s11162-013-9305-8>
- Dadds, M. R., Sicouri, G., Piotrowska, P. J., Collins, D. A. J., Hawes, D. J., Moul, C., Lenroot, R. K., Frick, P. J., Anderson, V., Kimonis, E. R., & Tully, L. A. (2019). Keeping parents involved: Predicting attrition in a self-directed, online program for childhood conduct problems. *Journal of Clinical Child and Adolescent Psychology*, 48(6), 881-893. <https://doi.org/10.1080/15374416.2018.1485109>
- Dai, H. M., Teo, T., Rappa, N. A., & Huang, F. (2020). Explaining Chinese university students' continuance learning intention in the MOOC setting: A modified expectation confirmation model perspective. *Computers & Education*, 150, 103850.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340. <https://doi.org/10.2307/249008>
- Detres, M., Lucio, R., Roberson, Z., Campbell, M., & Senger, P. (2020). Beyond grades: Student retention in an online MSW program. *Journal of Teaching in Social Work*, 40(4), 299-317. <https://doi.org/10.1080/08841233.2020.1787301>
- Edmunds, J. A., Gicheva, D., Thrift, B., & Hull, M. (2021). High tech, high touch: The impact of an online course intervention on academic performance and persistence in higher education. *Internet and Higher Education*, 49. <https://doi.org/10.1016/j.iheduc.2020.100790>
- Hart, C. (2012). Factors associated with student persistence in an online program of study: A review of the literature. *Journal of Interactive Online Learning*, 11(1), 19-42. Retrieved from <https://www.dvc.edu/academics/online-education/pdfs/Factors-Online-LitReview.pdf>
- Kennedy, J. (2014). Characteristics of massive open online courses (MOOCs): A research review, 2009-2012. *Journal of Interactive Online Learning*, 13(1), 1-16. Retrieved from <https://www.learntechlib.org/p/153508/>
- Lakhal, S., & Khechine, H. (2021). Technological factors of students' persistence in online courses in higher education: The moderating role of gender, age and prior online course experience. *Education and Information Technologies*, 26(3), 3347-3373. <https://doi.org/10.1007/s10639-020-10407-w>
- Lee, H., Chang, H., & Bryan, L. (2020). Doctoral students' learning success in online-based leadership programs: Intersection with technological and relational factors. *The International Review of Research in Open and Distributed Learning*, 21(1), 61-81. <https://doi.org/10.19173/irrodl.v20i5.4462>
- Lee, Y., & Choi, J. (2010). A review of online course dropout research: Implications for practice and future research. *Educational Technology Research and Development*, 59(5), 593-618. <https://doi.org/10.1007/s11423-010-9177-y>

- Magsayo, R. T. (2022). Mobile learning adoption continuance: Role of locus of control on its determinants. *Interactive Technology and Smart Education*. <https://doi.org/10.1108/ITSE-10-2021-0191>
- Mwenje, S., & Kasowe, R. (2013). Student involvement in enhancing student retention, persistence and success in open and distance learning at Zimbabwe Open University. *African Educational Research Journal*, 1(1), 46-50. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1220250.pdf>
- Nichols, A., & Levy, Y. (2009). Empirical assessment of college student-athletes' persistence in e-learning courses: A case study of a U.S. National Association of Intercollegiate Athletics (NAIA) institution. *The Internet and Higher Education*, 12(1), 14-25. <https://doi.org/10.1016/j.iheduc.2008.10.003>
- Netanda, R. S., Mamabolo, J., & Themane, M. (2019). Do or die: Student support interventions for the survival of distance education institutions in a competitive higher education system. *Studies in Higher Education*, 44(2), 397-414. <https://doi.org/10.1080/03075079.2017.1378632>
- Ng, C. (2019). Shifting the focus from motivated learners to motivating distributed environments: A review of 40 years of published motivation research in Distance Education. *Distance Education*, 40(4), 469-496. <https://doi.org/10.1080/01587919.2019.1681892>
- Nistor, N., & Neubauer, K. (2010). From participation to dropout: Quantitative participation patterns in online university courses. *Computers & Education*, 55(2), 663-672. <https://doi.org/10.1016/j.compedu.2010.02.026>
- Paton, R. M., Fluck, A. E., & Scanlan, J. D. (2018). Engagement and retention in VET MOOCs and online courses: A systematic review of literature from 2013 to 2017. *Computers & Education*, 125, 191-201. <https://doi.org/10.1016/j.compedu.2018.06.013>
- Pereira, F. A. D., Ramos, A. S. M., Gouvea, M. A., & da Costa, M. F. (2015). Satisfaction and continuous use intention of e-learning service in Brazilian public organizations. *Computers in Human Behavior*, 46, 139-148. <https://doi.org/10.1016/j.chb.2015.01.016>
- Rao, K., & Giuli, C. (2010). Reaching remote learners: Successes and challenges for students in an online graduate degree program in the Pacific Islands. *International Review of Research in Open and Distance Learning*, 11(1), 141-160. <https://doi.org/10.19173/irrodl.v11i1.785>
- Rockinson-Szapkiw, A., Spaulding, L., & Spaulding, M. (2016). Identifying significant integration and institutional factors that predict online doctoral persistence. *The Internet and Higher Education*, 31, 101-112. <https://doi.org/10.1016/j.iheduc.2016.07.003>
- Rudhumbu, N. (2021). University students' persistence with technology-mediated distance education: A response to COVID-19 and beyond in Zimbabwe. *International Review of Research in Open and Distance Learning*, 22(4), 89-108. <https://doi.org/10.19173/irrodl.v23i1.5758>
- Stewart, J., Mallery, C., & Choi, J. (2013). College student persistence: A multilevel analysis of distance learning course completion at the crossroads of disability status. *Journal of College Student Retention: Research, Theory & Practice*, 15(3), 367-385. <https://doi.org/10.2190/CS.15.3.d>
- Thelwall, M., & Maflahi, N. (2022). Research co-authorship 1900–2020: Continuous, universal, and ongoing expansion. *Quantitative Science Studies*, 3(2), 331–344. https://doi.org/10.1162/qss_a_00188
- Volk, F., Floyd, C. G., Shaler, L., Ferguson, L., & Gavulic, A. M. (2020). Active duty military learners and distance education: Factors of persistence and attrition. *American Journal of Distance Education*, 34(2), 106–120. <https://doi.org/10.1080/08923647.2019.1708842>
- Yasmin, D. (2013). Application of the classification tree model in predicting learner dropout behaviour in open and distance learning. *Distance Education*, 34(2), 218-231. <https://doi.org/10.1080/01587919.2013.793642>

Funding:

This work was supported by the 2023 Humanities and Social Science Research Grant (Young Researcher Fund) sponsored by the Ministry of Education of the People's Republic of China [grant number. 23YJC880015].

Dai, H. M., Ni, K., Rappa, N. A., Long, X., Wu, C., Wang, Y., Teo, T. & Zhang, M. (2023). Explaining persistence in online learning: A review study. In T. Cochrane, V. Narayan, C. Brown, K. MacCallum, E. Bone, C. Deneen, R. Vanderburg, & B. Hurren (Eds.), *People, partnerships and pedagogies*. Proceedings ASCILITE 2023. Christchurch (pp. 373 - 377). <https://doi.org/10.14742/apubs.2023.483>

Note: All published papers are refereed, having undergone a double-blind peer-review process. The author(s) assign a Creative Commons by attribution license enabling others to distribute, remix, tweak, and build upon their work, even commercially, as long as credit is given to the author(s) for the original creation.

© Dai, H. M., Ni, K., Rappa, N. A., Long, X., Wu, C., Wang, Y., Teo, T. & Zhang, M. 2023