Research in Learning Technology
Vol. 31, 2023

ASSOCIATION FOR LEARNING TECHNOLOGY ALT

ORIGINAL RESEARCH ARTICLE

The influence of user-perceived benefits on the acceptance of microlearning for librarians' training

Irene Shubi Isibika[a]*, Chang Zhu[a], Egbert De Smet[b] and Albogast K. Musabila[c]

[a]*Department of Education Sciences, Vrije Universiteit Brussels, Brussels, Belgium;* [b]*Department of Information and Library Science, Antwerpen University, Antwerp, Belgium;* [c]*School of Business, Mzumbe University, Morogoro, Tanzania*

(Received: 18 October 2022; Revised: 25 February 2023; Accepted: 8 March 2023; Published: 20 April 2023)

Microlearning has shifted professional training and development and its acceptance depends on perceived user benefits. This study examines the influence of user-perceived benefits on librarians' acceptance of the microlearning approach in selected universities in Tanzania. Using a questionnaire informed by the variables of the Technology Acceptance Model (TAM) model to collect data from a sample of 64 librarians, the results indicated that the perceived ease of use was found to play a more significant role in the acceptance of microlearning than perceived usefulness. However, the lack of in-person/physical interaction with peers during the training deterred the use of microlearning by the librarians. The positive influence of perceived usefulness and ease of use on the acceptance of microlearning strengthens the relevance of adopting microlearning as a didactic technology for librarians' training. The findings imply that proper implementation of microlearning as a training avenue is key due to the plenteous benefits it affords over the challenges.

Keywords: microlearning; learning technologies; training; librarians; didactic; pedagogical

Introduction

Technology has transformed workplace training and professional development. Many organisations are embracing the use of didactic technologies to conduct professional development. One such didactic technology is microlearning. The microlearning concept has quickly gained much traction in the training industry, especially in workplace training. Research indicates the rise of and usefulness of microlearning in employee training, increasing its use by companies (Taylor and Hung 2022). Researchers have tried to define microlearning as a form of e-learning delivered in small chunks, focused on delivering skill-based and just-in-time knowledge (Zhang and West 2019). It may refer to short-term learning activities based on small pieces of information, brief video segments, short podcasts, etc. (Reinhardt and Elwood 2019). Generally, the microlearning concept has adopted the

*Corresponding author. Email: isisibika@mzumbe.ac.tz

Citation: Research in Learning Technology 2023, **31**: 2930 - http://dx.doi.org/10.25304/rlt.v31.2930

following characteristics to fit current global dimensions in its design as pointed out by (Redondo *et al.* 2021)

- Time: a limited effort leads to short-time requirements.
- Content: short units with well-delimited subject matters and relatively simple problems.
- Curriculum: parts of modules or parts of curricular content, brief didactic elements, etc.
- Format: diversity of formats, such as fragments, lab assignments, etc.
- Process: activities that are either independent or integrated into a broader context, iterative processes, etc.
- Media: on-demand learning or distance learning is based on different multimedia content.
- Learning models: repetitive, reflexive, pragmatic, constructivist, concept-based, connectivist, etc.

Microlearning enables learners to reduce information overload, enrich learning processes, improve training effectiveness, and increase learners' level of engagement in online environments (Nikou and Economides 2018; Shamir-Inbal and Blau 2020). This is because it aids better retention thus allowing learners to develop self-regulation skills and lifelong learning capacities (Aldosemani 2019; Reinhardt and Elwood 2019). Microlearning has an asynchronistic aspect, allowing the learner to control the place, method, and time of access to information (de Gagne *et al.* 2019).

Continued employee training and development keeps companies competitive, increases employee retention, and augments the quality of a company's services thus training and development establishments are increasingly looking for ways to reach more employees (Brown *et al.* 2018; eLearning Industry 2022). Fostering lifelong learning and continuing education in working adults has been an essential custom in organisations and technology has enhanced change in workplace learning. The change has been influenced by today's fast-paced and digitally savvy working environment as stated by Puah *et al.* (2022) leading to a notable increase in demand for just-in-time instruction and training. Moreover, learners have a greater volition in deciding what technologies to use and when and how learning should occur.

The librarianship profession has experienced a shift in operations. Complex library users, an influx of readily available information, and the introduction of automated libraries have required a change in the skillset of librarians. The modern libraries are managed by a Intergrated Library Management System that incorporates various modules of library functions (Zainab *et al.* 2018). This has necessitated librarians to acquire new skill sets. The decreasing training budgets have led universities to use less costly means for employee training (Isibika *et al.* 2021, 2022). MOOCs and webinars have been used to equip library staff with new knowledge and skills. However, time allocated for training, extensive coverage of topics in a short time, and the inability to quickly revisit training content have incapacitated librarians from fully utilising and implementing the knowledge. Microlearning is now paving a better training avenue since it overcomes such barriers (Chai-Arayalert and Puttinaovarat 2020; Dolasinski and Reynolds 2020).

The current study was constituted following two earlier studies; 1 on librarians needs analysis and 2 on the design and development of microlearning training content (videos) to train librarians on the use of the ABCD library management

Citation: Research in Learning Technology 2023, **31**: 2930 - http://dx.doi.org/10.25304/rlt.v31.2930

system. The training content were deployed in a dedicated YouTube channel https://www.youtube.com/@ireneshubiisibika1609/videos and also uploaded to the available library computers. Librarians were then free to upload them to their mobile devices for use whenever needed. This encouraged self-regulated learning.

The user-perceived benefits of microlearning

For this study perceived benefit embodies the perceived usefulness and ease of use adopted from the TAM model (Davis 1989). Microlearning has been widely used for workplace training and research has shown a significant improvement and outperformance of employees when learning was performed using microlearning (Bannister, Neve, and Kolanko 2020; Cheng, Liu, and Wang 2017; Gross *et al.* 2019; Ichiuji *et al.* 2022; Pascual *et al.* 2018; Sawarynski and Baxa 2019; Wakam *et al.* 2022). Shamir-Inbal and Blau (2020) employed microlearning in designing teacher professional development (TPD) for ICT teacher leaders and realized that microlearning is appropriate for pedagogical innovations. Reinhardt and Elwood (2019) researched the possibility of using microlearning and personal learning environments to promote a growth mindset in learners. They analysed how university faculty responsible for the preparation of teachers face challenges in integrating technology into their duties. They discovered that microlearning allows the professional development of faculty and students to be situated in a flexible way that can be integrated into everyday activities supporting individual learning aims and goals.

Microlearning enables learners to practice learning on relatively small, focused learning units and activities usually completed in < 10 min and accessible on multiple devices (Shail 2019). It is an effective strategy because of its learner-centred, easy-to-access, interactive, and well-designed features. The successful use of microlearning depends on various aspects and measurements including learning content, duration, curriculum level, form, process, mediality, and learning type (Chai-Arayalert and Puttinaovarat 2020; Redondo *et al.* 2021; Yin *et al.* 2020) and conceals the boundary between formal and informal learning. It allows collaboration between each learner to access the skill set that will push their development further, while developing self-regulated, lifelong learning capacities (Buchem and Hamelmann 2010).

Microlearning user acceptance

The success of microlearning is mainly dependent on the motivation for self-learning. The learner's lack of motivation may lead to poor reception of the microlearning lessons (Ogange and Mishra 2021). Without acceptance, discretionary users will seek alternatives. Acceptance has been conceived as an outcome variable in a psychological process that users go through in making decisions about the use or unuse of a particular technology. It is anticipated that librarians may quickly adopt and use microlearning for its many benefits, such as self-controlled learning. Given the increasing interest and demand for microlearning in workplace training, studying the acceptance and usage of microlearning is paramount. Several studies on microlearning have focused on its characteristics, traits, strengths, and limitations (Wen and Zhang 2015; Zhang and West 2019) with few focusing on the practical implementation and attitude/acceptance of microlearning among users. According to Puah *et al.* (2022), one of the most challenging impediments to overcome is employee resistance toward technology.

Challenging aspects of microlearning

Microlearning has generally realized a positive shift in employee training. However, challenges alongside its implementation have brought about discussions (Aldosemani 2019; Isibika *et al.* 2022; Wen and Zhang 2015; Zhang and West 2019) in training and development on matters such as suitability, that is, if every subject can be trained using microlearning and accessibility for all. For instance, not all trainees are digitally literate. The use of microlearning requires one to be digitally literate to access digital learning tools and participate in e-activities. The librarians for this study were all digital-savvy and hence suitable for this microlearning training. Microlearning is also neither merely the act of uploading learning materials online nor creating a complete learning experience into small bites running in a few seconds/minutes. Its foremost goal is to close knowledge and performance gaps identified at the comfort of trainees. Thus, challenges such as personalising training content to fit every individual need, updating content in relevance and structure, and meeting trainees' needs timely are still concealing the full implementation and utilisation of microlearning at a large scale. It is thus vital to determine the challenges experienced during training to develop possible solutions since some challenges can only be known after the implementation phase. This study aims to ascertain the challenges encountered by librarians in using microlearning for training.

Conceptual model of this study and research questions

This research aims to determine the influence of perceived benefits and challenges on the acceptance of microlearning for training librarians. The librarians' acceptance of microlearning is dependent on the Perceived Usefulness (PU) and Perceived Ease of Use (PEoU). Figure 1 shows the conceptual model.
Specific research questions are addressed as follows:

(1) What are the perceived benefits (PU and PEoU) of microlearning and the developed content for the librarians?
(2) What are the challenges that librarians face in using microlearning and the developed content that influence the perceived benefits?
(3) What are the differences between the PU and PEoU of previous traditional training on ABCD and the microlearning training on ABCD?

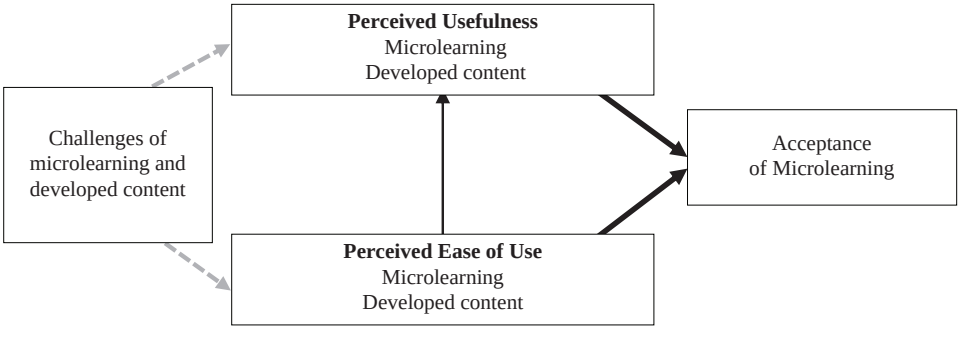

Figure 1. Conceptual framework derived from TAM model (Davis 1989).

Citation: Research in Learning Technology 2023, **31**: 2930 - http://dx.doi.org/10.25304/rlt.v31.2930

(4) What is the relationship between the benefits (PU and PEoU) of microlearning and the acceptance of using microlearning for training?
(5) To what extent do the librarians differ on their perceived benefits of microlearning according to when their previous (traditional) training took place?

Methodology

This study examined the user-perceived benefits of using microlearning and the developed training content to train librarians and whether these benefits influence the acceptance of microlearning. Perceived usefulness and perceived ease of use have been highlighted in prior literature to be prominently influential in enhancing the intention to adopt and accept different information technologies. Four determinants were identified: perceived usefulness, perceived ease of use, challenges, and acceptance of microlearning.

Instrument design

The study employed a quantitative methodology. To answer the research questions, a self-administered five-point Likert-scale questionnaire labeled as 'Strongly Disagree', 'Disagree', 'Neutral', 'Agree', and 'Strongly Agree', and ranged from 1 to 5, respectively, was used. The questionnaire format was predominantly closed with a small number of open questions. The respondents were informed that anonymity was guaranteed and that the data would be used for research only.

Research participants

The respondents of this study were all librarians who worked in the selected university libraries in Tanzania and confirmed having accessed and used the developed training content. Those who had not yet used the content for training were automatically disqualified from participating in this survey. The developed content was given to the librarians 3 months before conducting this study. This ensured enough time for the librarians to interact with the content. Participants' demographic data are highlighted in Table 1.

Data collection

The research team identified and recruited 'microlearning head librarians' who acted as champions for the microlearning training, encouraging peers to complete and use developed content for training purposes. The 'microlearning head librarians' were also responsible for the closer follow-up of the data collection exercise and sometimes clarified questions amongst their peers.

Data analysis

The collected data were analysed using SPSS v.22. For the first three research questions, we employed descriptive analysis. Descriptive analysis interprets information patterns that might emerge from data and summarises the findings

Table 1. Demographic profile of respondents.

Demographics		No of respondents	Percentage (%)
Which university do you belong to?	Mzumbe University	26	40.6
	SUA	16	25.0
	JUCo	7	10.9
	CUCoM	9	14.1
	Mweka	6	9.4
Years of interaction with the ABCD system	< 1 year	9	14.1
	1–5 years	28	43.8
	5–10	17	26.6
	> 10 years	10	15.6
If you have ever received training on the ABCD circulation module	Yes	57	89.1
	No	7	10.9
Frequency of training	Never	10	15.6
	< 1 year ago	36	56.3
	1–3 years	15	23.4
	> 3 years	3	4.7

meaningfully. Spearman correlation analysis was conducted to explore the relationship between PU and PEoU regarding the acceptance of microlearning as a training format.

The instrument is checked for reliability based on Cronbach's alpha value. The Cronbach alpha (α) is commonly used to verify the internal consistency reliability of constructs. Table 2 displays the Cronbach's alpha (α) values for each of this study's constructs and all computed values are above the 0.7 standards recommended by (Hair, Ringle, and Sarstedt 2011), which suggests adequate reliability and high internal consistency.

Results

Perceived benefits (PU and PEoU) of microlearning training format (RQ1)

In the self-administered questionnaire, librarians were asked how they perceived microlearning usefulness and ease of use. In general, librarians' perception of the perceived benefit of microlearning is positively strong PU (M = 3.96, standard deviation [SD] = 0.55), PEoU (M = 3.81, SD = 0.57). The microlearning peculiarities most useful to the librarians included the increasing availability of training resources and higher retention of learned skills. For the perceived ease of use, flexibility of microlearning enabled them to learn more efficiently while the convenience of learning and training on the job was advantageous to them. These results imply that using microlearning for training librarians will conveniently provide access to training materials whenever needed and thus increase their performance. The results prove that PU and PEoU are important aspects of technological acceptance even more so for new pedagogical technologies such as microlearning.

Citation: Research in Learning Technology 2023, **31**: 2930 - http://dx.doi.org/10.25304/rlt.v31.2930

Table 2. Constructs, sample items, reliability coefficients indices.

Construct	No. of items	Sample items	Cronbach's alpha
Perceived usefulness of microlearning	7	Microlearning improves the retention of learned skills and knowledge	0.827
Perceived ease of use of microlearning	6	The control over training allows me to learn whenever needed	0.813
Perceived usefulness of content	6	Developed content reduces the time and effort required to learn about the ABCD circulation module	0.845
Perceived ease of use of content	6	It is easy for me to remember how to perform tasks from the developed content	0.870
Challenges of micro-learning training format	7	Lack of available infrastructure (e.g. computers, smartphones) to access microlearning training	0.764
Challenges of the developed content	4	Language barrier in the developed content	0.902
Accessibility	4	The microlearning training format promotes re-accessibility	0.789
Flexibility	3	The microlearning training format encourages self-paced learning	0.754
Effectiveness	3	The microlearning training format enhances knowledge retention and upgradation	0.765
Interaction	3	The microlearning training format supports peer interactions	0.826
Acceptance	4	I am satisfied with microlearning as a training technique	0.707

Perceived benefits (PU and PEoU) of the microlearning developed content (RQ1)

The librarians were also asked to indicate their perception of the developed training content. The participants strongly perceived the developed training content to be useful and easy to use PU (M = 3.78, SD = 0.59) and PEoU (M = 3.81, SD = 0.55). The results show that using the developed videos to train the librarians on the use of the ABCD system was poignant. It can be concluded that using microlearning will enhance librarians' job performance and effectiveness while increasing their knowledge and skills.

Challenges faced by librarians in using the microlearning training format and developed content (RQ2)

Results from Table 3 show the challenges experienced by librarians while using microlearning. The mean score (M = 3.20) is elaborated by challenges such as a lack of in-person/physical interaction with peers. Librarians expressed this as a challenge

because they are used to face-to-face classroom-based training. In addition, the lack of available infrastructure in the libraries to access microlearning training was also seen as a challenge. However, the librarians opted to train using their mobile devices to benefit from the training. As for the developed content (M = 2.89), few librarians experienced a lack of clarity of the developed content. To gain a deeper understanding of this result, a crosstabulation was run between the university they belong to, years of interaction with the system, and the challenges encountered. Results indicate that for the universities that have used the ABCD system for more than 10 years, more than half of their librarians, who had less than 5 years of interaction with the system reported a lack of clarity of the developed content and the content being too advanced for them. These results show the unfamiliarity of the ABCD system by librarians and hence a need for more frequent training (microlearning) on using the ABCD.

The differences between the previous traditional training on ABCD and the microlearning training on ABCD (RQ3)

The study sought to investigate whether librarians perceived a difference (positive or negative) between previous training on the usage of the ABCD system and the current microlearning training. Previous traditional training included face-to-face training, reading the software manual for instructions, workshops, seminars, etc. Four main scales were used to determine the differences: *Accessibility, Flexibility, Effectiveness, and Interaction*. Table 4 shows the results.

The results reveal that the accessibility, flexibility, and effectiveness of microlearning brought about a difference making the microlearning training technique a better preference for training. Even though librarians expressed a lack of physical human interaction during the training, they still highly ranked the whole microlearning experience. Accessibility, flexibility, and effectiveness of training have been emphasised as important factors in determining the impact that training sessions could have on employees and so these results reemphasise the importance and therefore accentuate why microlearning is apt. It can conclusively be said that microlearning should be implemented as a new training technique for librarians.

Table 3. Challenges of microlearning format and developed content.

Challenges	**Mean**	**SD**
Challenges of the microlearning format	3.20	0.72
Challenges of the developed content	2.89	0.94

Table 4. Difference between microlearning and traditional training format.

Differences	**Mean**	**SD**
Accessibility	3.97	0.59
Flexibility	3.91	0.53
Effectiveness	3.90	0.59
Interaction	3.19	0.85

Citation: Research in Learning Technology 2023, **31**: 2930 - http://dx.doi.org/10.25304/rlt.v31.2930

The relationship between the benefits of microlearning and the acceptance of using microlearning for training (RQ4)

This study sought the relationship between the perceived benefits (PU and PEoU) of microlearning as a training format and its acceptance. The acceptance scale included four statements on acceptance: *I will use microlearning to learn other skills, I am satisfied with microlearning as a training technique, I will recommend the use of microlearning to other people, and I do not like the microlearning technique.* A multiple regression analysis was conducted to determine the relationship between the perceived benefits and the acceptance of microlearning. This statistical method was used to study the strength of the relationship between perceived benefit (PU and PEoU) and acceptance of the microlearning format.

Results reveal a significantly strong positive correlation between PU ($r = 0.501$, $p < 0.001$) and PEoU ($r = 0.520$, $p < 0.001$) demonstrating that both perceived usefulness and ease of use positively influence the acceptance of microlearning as a training technique for the librarians. The regression results indicate that the model explained 30.0% of the variance and that the model was a significant predictor of acceptance of microlearning, $F(2,61) = 13.05$, $p \leq 0.001$. Both perceived benefits positively influence the acceptance of microlearning with perceived ease of use contributing more significantly ($\beta = 0.330$, $p \leq 0.043$) than perceived usefulness ($\beta = 0.256$, $p = 0.114$). If perceived ease of use increases, the acceptance of microlearning increases by 0.430 times.

The extent to which the librarians differ in their perceived benefits of microlearning when compared with when their previous (traditional) training took place (RQ5)

The study investigated whether there is a significant difference between the frequency of training and the perceived benefit of using microlearning for training. The frequency of training was grouped into four categories as seen in Table 1. A one-way analysis of variance (ANOVA) test was performed between PU and PEoU categories.

Results show that there is no statistically significant difference between training frequency and PU ($F(3,54) = 0.89$, $p = 0.45$) and PEoU ($F(3,54) = 0.64$, $p = 0.60$). These findings indicate no difference between the perceived usefulness and ease of use of the microlearning training format amongst librarians regardless of when they received their last training. The results indicate that frequency of training has no moderating role to play in determining the perceived benefit of microlearning meaning that whether they just received training or not, microlearning is still very beneficial and thus validates the benefits of microlearning to librarians' training regardless of their training frequency.

Discussion

The main aim of this study is to determine the influence of user-perceived benefits (PU and PEoU) and challenges on the acceptance of microlearning for training. The TAM model (Davis 1986) was adopted to achieve this aim.

Perceived usefulness and ease of use of microlearning

Overall, librarians perceived the microlearning technique useful since microlearning enhanced their learning, improved their retention of learned skills, and saved their time.

Our results corroborate findings from other researchers (Aldosemani 2019; Redondo *et al.* 2021; Reinhardt and Elwood 2019) who discovered that such characteristics of microlearning outweigh other training techniques. The study's findings suggest that librarians also perceived microlearning as easy to use. This is because of the flexibility of microlearning that allows them to learn more efficiently, the control over learning that allows them to train whenever needed, and the convenience to learn and train on the job. The perceived benefits of the librarians on the microlearning training format as revealed by this study show that using microlearning for training will positively impact skills generation and knowledge gain for the librarians. These findings are also in line with study by Jomah *et al.* 2016; Kovachev *et al.* 2011; Shail 2019. The results of this research suggest that librarians will benefit from using microlearning for training. This implies that there will be a significant increase in the use of microlearning for skill and knowledge requisition eventually leading to a revamp of their competencies.

Perceived usefulness and ease of use of the developed content

The study's aim to determine the perceived usefulness and ease of use of the developed content enriched and provided an in-depth understanding of the developed microlearning content. The librarians perceived the developed content as useful because it increased their professional abilities and productivity while enhancing their skills and understanding of the ABCD library management system. The developed content also boosted the librarians' effectiveness in using the ABCD system. The librarians signified the ease of use as more influential than its usefulness. They denoted that the developed content was easy to use since it became easy for them to remember how to perform tasks on the system enhancing their capabilities to use the system. These findings align with those of Lee-Fiedler (2021) who discovered that nurse educators were more satisfied with the ease of use of microlearning compared with its usefulness. The use of a library management system augments service delivery of library operations and hence librarians must be appropriately skill-equipped to use the available systems. The results have shown that using the microlearning approach to train librarians will increase the rate at which librarians acquire these skills.

Challenges using microlearning and the developed content

The implementation of new technology brings about several challenges. Librarians used the microlearning approach despite the challenges they faced. The biggest challenge for librarians was the lack of in-person interaction with peers during the training sessions. The underlying reason for this is that librarians are habituated to the classroom learning environment. This is also indicated by Ikolo and Nongo (2022) who discovered that librarians' training sessions are usually organised in the form of seminars/workshops. However, this challenge will be overcome by the continual use of microlearning for their training needs, which will bring about the many benefits and advantages of microlearning. Another challenge encountered by librarians is the lack of library computers to access microlearning training. Despite this, librarians still used their mobile devices to train using microlearning. It is thus advisable to install enough computers in these libraries to fully grasp the benefits of microlearning. The use of electronic devices facilitates mobility, dynamism, and flexibility, all of which are inherent to microlearning (Redondo *et al.* 2021).

Citation: Research in Learning Technology 2023, **31**: 2930 - http://dx.doi.org/10.25304/rlt.v31.2930

Librarians expressed concern about the lack of clarity regarding the developed training content. The results indicated that for universities that used the ABCD system for more than 10 years, the librarians who had less than 5 years of interaction with the system reported a lack of clarity in the developed content. Research shows that the more users use a system, the less severity of challenges and usability problems (Mclellan, Muddimer, and Peres 2012). For these librarians, the lack of clarity may have stemmed from their inexperience in using the system and, hence, having less time to interact with it. This means they do not fully understand its functionality and therefore fail to gain clarity on what the training content is about. Self-learning may have also limited the developed content's understanding since many librarians are not used to this sort of learning. This study, therefore, suggests that more frequent use of microlearning for training the librarians on the use of the ABCD system, will equip them with more ABCD skills and thus increase their understandability of the system use.

Traditional training versus the microlearning training

Librarians have been exposed to face-to-face training sessions to equip them with proper knowledge and skills, but technology use, pedagogical and didactic learning technologies, different training avenues, and the ever-decreasing budget have made it difficult to meet the ever-changing training needs of librarians (Isibika *et al.* 2021). The acceptance of microlearning by the librarians is concretised with how they perceive the differences in the training methods and to what extent this difference is significant. This study suggests that if librarians notice a difference in training formats, they are likely to accept and adopt the use of microlearning for training. As they adapt, they will perceive its benefit and no longer perceive the lack of human interaction as a challenge.

Perceived benefits versus acceptance of microlearning

The findings show a positive correlation between PU and PEoU and acceptance of microlearning suggesting that the perceived benefit of microlearning is key to its successful use. Evidently from the findings, when PEoU increases, the acceptance of microlearning increases. This implies that workplaces, organisations, and training providers may leverage the PEoU of microlearning to encourage its more use in employee training. The results are opposite to those from other studies (Ahmed and Ward 2016; dos Santos, Miguel, and Okazaki 2015), which mainly refer to PU being a stronger predictor of acceptance of technology when compared with PEoU. However, these results may be influenced by the fact that the librarians liked using videos to learn skills when compared with their normal training avenues. We, therefore, suggest that it is imperative to foster librarians' motivation to use the microlearning training format for training, as it will quickly and cost-effectively impart new knowledge and skills, increasing productivity in their daily activities.

Training frequency against perceived benefits of microlearning

The study investigated whether there is a significant difference between the training frequency and the perceived benefit of using microlearning for training. The

study believes that the lesser the training frequency, the more the perceived benefit of microlearning. If the librarians lack frequent training on using the ABCD system, they will find microlearning training beneficial because of its advantage of anywhere-anytime training sessions. Even though librarians mentioned a lack of in-person interaction with peers during training, what is interesting to discover is that there is no significant statistical difference between the perceived benefit of microlearning training over the frequency of training. The frequency of training has no moderating role to play in determining the perceived benefit of microlearning. The results validate the benefits of microlearning to librarians' training regardless of their training frequency.

Implications

This study demonstrates the influence of perceived usefulness and ease of use on the acceptance of microlearning as a training format for librarians. The positive relationship between the variables (PU and PEoU) and acceptance strengthens the relevance of adoption of new educational technologies for employee training. Despite challenges, librarians are still keen on using microlearning for training and universities should ensure the availability of enough computers to enable easy access to microlearning content. This will bring forth a much-desired difference in training practices and overcome training barriers.

Conclusion

This study found that microlearning is perceived as useful, flexible, and effective in offering workplace training to librarians. These results are of great importance, as they allow for the consolidation of technological solutions in the area of microlearning that allow to train librarians vis-a-vis employees on specific topics in particular and adapt to the activities and changes that occur in today's workplaces. The results provide a strong foundation for further studies to assess the outcomes of using microlearning in other professional disciplines and practices.

Disclosure statement

No potential conflict of interest was reported by the author.

Funding

This work was supported by the Vlaamse Interuniversitaire Raad.

References

Ahmed, E. & Ward, R. (2016) 'A comparison of competing technology acceptance models to explore personal, academic and professional portfolio acceptance behaviour', *Journal of Computers in Education*, vol. 3, pp. 169–191. doi: 10.1007/s40692-016-0058-1

Aldosemani, T. I. (2019) 'Microlearning for macro-outcomes: students' perceptions of telegram as a microlearning tool', in *Digital Turn in Schools—Research, Policy, Practice. Lecture*

Citation: Research in Learning Technology 2023, **31**: 2930 - http://dx.doi.org/10.25304/rlt.v31.2930

Notes in Educational Technology, eds T. Väljataga & M. Laanpere, Springer, Singapore. https://doi.org/10.1007/978-981-13-7361-9_13

Bannister, J., Neve, M. & Kolanko, C. (2020) 'Increased educational reach through a microlearning approach: can higher participation translate to improved outcomes?', *Journal of European CME*, vol. 9, no. 1. doi: 10.1080/21614083.2020.1834761

Brown, J., *et al.*, (2018) *Workforce of the Future: The Competing Forces Shaping 2030*. Available at: www.pwc.com/people

Buchem, I., & Hamelmann, H. (2010) 'Microlearning: a strategy for ongoing professional development', *eLearning Papers*, vol. 21, no. 7, pp. 1–15.

Chai-Arayalert, S. & Puttinaovarat, S. (2020) 'Designing mangrove ecology self-learning application based on a micro-learning approach', *International Journal of Emerging Technologies in Learning*, vol. 15, no. 11, pp. 29–41. doi: 10.3991/IJET.V15I11.12585

Cheng, Y. T., Liu, D. R. & Wang, V. J. (2017) 'Teaching splinting techniques using a just-in-time training instructional video', *Pediatric Emergency Care*, vol. 33, no. 3, pp. 166–170. doi: 10.1097/PEC.0000000000000390

Davis, F. D. (1986) A technology acceptance model for empirically testing new end-user information systems: theory and results [Massachusetts Institute of Technology]. https://dspace.mit.edu/handle/1721.1/15192

Davis, F. D. (1989) 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly: Management Information Systems*, vol. 13, no. 3, pp. 319–339. doi: 10.2307/249008

Dolasinski, M. J. & Reynolds, J. (2020) 'Microlearning: a new learning model', *Journal of Hospitality & Tourism Research*, vol. 44, no. 3, pp. 551–561. doi: 10.1177/1096348020901579

de Gagne, J. C., *et al.*, (2019) 'Microlearning in health professions education: scoping review', *JMIR Medical Education*, vol. 5, no. 2, p. e13997. doi: 10.2196/13997

dos Santos, R., Miguel, L. & Okazaki, S. (2015) 'Planned e-learning adoption and occupational socialisation in Brazilian higher education', vol. 41, no. 11, pp. 1974–1994. doi: 10.1080/03075079.2015.1007940

eLearning Industry. (2022) *The Benefits of Employee Training*. Available at: https://elearningindustry.com/benefits-of-employee-training

Gross, B., *et al.*, (2019) 'Microlearning for patient safety: crew resource management training in 15-minutes', *PLoS One*, vol. 14, no. 3, p. e0213178. doi: 10.1371/JOURNAL.PONE.0213178

Hair, J. F., Ringle, C. M. & Sarstedt, M. (2011) 'PLS-SEM: indeed a silver bullet', *Journal of Marketing Theory and Practice*, vol. 19, no. 2, pp. 139–152. doi: 10.2753/MTP1069-6679190202

Ichiuji, B. A., *et al.*, (2022) 'The effect of a microlearning module on knowledge acquisition in surgery clerkship students', *Journal of Surgical Education*, vol. 79, no. 2, pp. 409–416. doi: 10.1016/J.JSURG.2021.11.001

Ikolo, V. E. & Nongo, C. J. (2022) 'Training needs of medical librarians in Nigeria: a survey', *Health Information & Libraries Journal*, vol. 39, no. 2, pp. 155–165. doi: 10.1111/HIR.12383

Isibika, I. S., *et al.*, (2021) 'Perceived training needs assessment of librarians in Tanzanian academic libraries aimed at introducing microlearning intervention to training', *International Journal of Training Research*, vol. 19, no. 2, pp. 107–124. doi: 10.1080/14480220.2021.1896565

Isibika, I. S., *et al.*, (2022) 'Microlearning training intervention for librarians: design and development', *INTED2022 Proceedings*, vol. 1, pp. 7432–7440. doi: 10.21125/INTED.2022.1878

Jomah, O., *et al.*, (2016) 'Micro learning: a modernized education system', *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, vol. 7, no. 1, pp. 103–110. Available at: https://www.edusoft.ro/brain/index.php/brain/article/view/582/627.

Kovachev, D., Cao, Y., Klamma, R. & Jarke, M. (2011) 'Learn-as-you-go: new ways of cloud-based micro-learning for the mobile web', in *Advances in Web-Based Learning - ICWL 2011. ICWL 2011. Lecture Notes in Computer Science*, vol. 7048, eds H. Leung,

E. Popescu, Y. Cao, R.W.H. Lau & W. Nejdl, Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-25813-8_6

Lee-Fiedler, J. D. (2021) *Nurse Educator's Experience using Microlearning Strategies: A Basic Qualitative Study*. PhD Thesis. Capella University.

Mclellan, S., Muddimer, A. & Peres, S. C. (2012) 'The effect of experience on system usability scale ratings', *Journal of Usability Studies*, vol. 7, no. 2, pp. 56–67.

Nikou, S. A. & Economides, A. A. (2018) 'Mobile-based micro-learning and assessment: impact on learning performance and motivation of high school students', *Journal of Computer Assisted Learning*, vol. 34, no. 3, pp. 269–278. doi: 10.1111/jcal.12240

Ogange, B. & Mishra, S. (2021) 'Introduction to microlearning 2', *Commonwealth of Learning*. Available at: http://oasis.col.org/bitstream/handle/11599/3877/2021_Allela_Introduction_to_Microlearning_Course.pdf?sequence=8&isAllowed=y#:~:text=Microlearning%20supports%20flexible%20and%20self,the%20end%20of%20each%20lesson

Pascual, K. J., *et al.*, (2018) 'Evaluating the impact of personalized stroke management tool kits on patient experience and stroke recovery', *Journal of patient experience*, vol. 5, no. 4, pp. 244–249. doi: 10.1177/2374373517750416

Puah, S., *et al.*, (2022) 'Investigating working adults' intentions to participate in microlearning using the decomposed theory of planned behaviour', *British Journal of Educational Technology*, vol. 53, no. 2, pp. 367–390. doi: 10.1111/BJET.13170

Redondo, R. P. D., *et al.*, (2021) 'Integrating micro-learning content in traditional e-learning platforms', *Multimedia Tools and Applications*, vol. 80, no. 2, pp. 3121–3151. doi: 10.1007/S11042-020-09523-Z/FIGURES/16

Reinhardt, K. S. & Elwood, S. (2019) *Promising Practices in Online Training and Support: Microlearning and Personal Learning Environments to Promote a Growth Mindset in Learners*, IGI Global. Available at: https://services.igi-global.com/resolvedoi/resolve.aspx?doi=10.4018/978-1-5225-6322-8.ch013

Sawarynski, K. E. & Baxa, D. M. (2019) 'Utilization of an online module bank for a research training curriculum: development, implementation, evolution, evaluation, and lessons learned', *Medical Education Online*, vol. 24, no. 1, p. 1611297. doi: 10.1080/10872981.2019.1611297

Shail, M. S. (2019) 'Using micro-learning on mobile applications to increase knowledge retention and work performance: a review of literature', *Cureus*, vol. 11, no. 8, p. e5307. doi: 10.7759/CUREUS.5307

Shamir-Inbal, T. & Blau, I. (2020) 'Micro-learning in designing professional development for ICT teacher leaders: the role of self-regulation and perceived learning', *Professional Development in Education*, vol. 48, no. 5, pp. 734–750. doi: 10.1080/19415257.2020.1763434

Taylor, A. D. & Hung, W. (2022) 'The effects of microlearning: a scoping review', *Educational Technology Research and Development*, vol. 70, no. 2, pp. 363–395. doi: https://doi.org/10.1007/s11423-022-10084-1

Wakam, G. K., *et al.*, (2022) 'Adapting to the times: combining microlearning videos and twitter to teach surgical technique', *Journal of Surgical Education*, vol. 79, no. 4, pp. 850–854. doi: 10.1016/J.JSURG.2022.02.001

Wen, C. & Zhang, J. (2015) 'Design of a microlecture mobile learning system based on smartphone and web platforms', *IEEE Transactions on Education*, vol. 58, no. 3, pp. 1–5. doi: 10.1109/TE.2014.2363627

Yin, J., *et al.*, (2020) 'Conversation technology with micro-learning: the impact of chatbot-based learning on students' learning motivation and performance', *Journal of Educational Computing Research,* vol. 59, no. 1, pp. 154–177. doi: 10.1177/0735633120952067

Zainab, A. M., *et al.*, (2018) 'UTAUT'S performance consistency: empirical evidence from a library management system', *Malaysian Journal of Library and Information Science*, vol. 23, no. 1, pp. 17–32. doi: 10.22452/mjlis.vol23no1.2

Zhang, J. & West, R. E. (2019) 'Designing microlearning instruction for professional development through a competency based approach', *TechTrends*, vol. 64, no. 2, pp. 310–318. doi: 10.1007/s11528-019-00449-4