The effect of age on higher education teachers' ICT use

Damijana Keržič
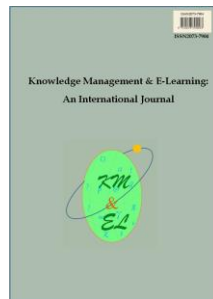**Manica Danko**
Vida Zorko
Mitja Dečman
University of Ljubljana, Slovenia

The effect of age on higher education teachers' ICT use

Damijana Keržič

Faculty of Public Administration
University of Ljubljana, Slovenia
E-mail: damijana.kerzic@fu.uni-lj.si

Manica Danko

Faculty of Public Administration
University of Ljubljana, Slovenia
E-mail: manica.danko@fu.uni-lj.si

Vida Zorko*

Faculty of Public Administration
University of Ljubljana, Slovenia
E-mail: vida.zorko@fu.uni-lj.si

Mitja Dečman

Faculty of Public Administration
University of Ljubljana, Slovenia
E-mail: mitja.decman@fu.uni-lj.si

*Corresponding author

Abstract: Many researchers have explored instructional use of information communication technology (ICT) in higher education and uncovered several factors that affect its application in teaching. The effect of age on university teachers' ICT use, however, has attracted much less attention. This study uses quantitative data from a survey of 401 teachers from the University of Ljubljana in Slovenia to reveal any differences in instructional ICT use in terms of age. The results show that age is not a factor in instructional ICT use, although some age-related differences appear in teachers' personal ICT uses. The findings may inform planning for teacher support along with training and quality assurance at the university's centre for ICT-supported teaching.

Keywords: Higher education; University teachers; ICT use; Age

Biographical notes: Damijana Keržič, BSc in Mathematics, MSc in Computer Science, is a senior lecturer in Informatics in Public Administration at the Faculty of Public Administration, University of Ljubljana. She was a member of the faculty team for developing the e-learning system and now supports and develops the system to meet the faculty's needs. Her research interests include e-learning, educational data mining and educational technology in higher education.

Manica Danko, MA in TESOL, is a lecturer of English for specific purposes at

the Faculty of Public Administration, University of Ljubljana. Her fields of interest include ESP e-learning course material design, teaching excellence with blended learning in public administration and the development of teacher and student competencies in higher education language learning.

Vida Zorko, MA EdTech & TESOL, is a lecturer in English for specific purposes at the Faculty of Public Administration, University of Ljubljana. Her research interests include ESP methodology for students of public administration, English for academic purposes, e-learning and collaborative e-learning.

Mitja Dečman, PhD, is an assistant professor and the vice dean for student affairs at the Faculty of Public Administration, University of Ljubljana. His project and research work covers the following areas: information systems, benchmarking systems, long-term digital preservation, digital government, digital transformation, information governance, and others.

1. Introduction

The recent COVID-19 pandemic has seen a dramatic rise in emergency remote teaching and increased the use of information communication technology (ICT) in higher education (HE). University teachers have been forced to swiftly adapt their ways of teaching to the new situation. Many have had to learn new ICT skills and start using new didactic approaches, to be able to deliver classes online. This newly acquired importance of ICT puts attempts to enhance teaching in HE institutions with ICT use in a fresh perspective.

Before the pandemic, strategic documents for guiding HE institutions in their implementation of ICT had been provided by certain international and national bodies. For example, in a study of 249 HE institutions from 38 European countries, Gaebel et al. (2014, p. 20) mapped the countries possessing national strategies for e-learning and found that only one quarter of them had an e-learning strategy/policy for HE. In Slovenia, the promotion of ICT in HE was included in 2016 in the 'Strategic guidelines for further implementation of ICT in Slovenian HE institutions until 2020' issued by the Slovenian Ministry of Education, Science and Sport (2016). Another strategic document is the 'Resolution on the national programme of higher education 2011–2020' (Ministry of Education, Science and Sport, 2011), which sets out guidelines for implementing ICT.

In 2017, the University of Ljubljana (UL) launched the project "Digital UL – with innovative use of ICT towards excellence – DiUL". The project aimed to enhance the quality of teaching and learning by promoting flexible ICT-supported approaches to instruction at its 23 faculties and 3 academies. It followed the UL's strategic guidelines by developing innovative teaching materials, learning environments, and a framework for using ICT in teaching, and by providing pedagogical as well as technical support to teaching staff. With innovative ICT-supported teaching approaches, the UL seeks to enhance the conditions for fostering the critical thinking of students who will become future scientists, artists, experts and leaders in actions that promote sustainability, respect for human beings, community, society and nature in a globalised and digitised world. Such approaches will also improve students' digital literacy and promote the development of other competencies and skills for better employability and involvement in society. Another intended project outcome was a university centre for ICT-supported teaching. Its

establishment has greatly been accelerated by UL teaching staff's increased need for both technical and pedagogical support during the COVID-19 pandemic.

The DiUL project conducted a survey to map ICT use at the UL. It sought to explore the pedagogical uses of ICT, the technical and organisational aspects of using ICT in teaching/learning with the aims to identify: (1) the extent and ways ICT is promoted in UL study programmes; (2) the existing ICT-supported teaching methods and practices; (3) the ICT tools and open e-content that are used; and (4) examples of ICT use in teaching. The study also identified the needs of UL faculties in terms of technical, technological and organisational support as well as support for developing innovative learning environments and introducing ICT-supported teaching in all study fields. The survey results formed the basis for the planning and development of innovative learning environments, the introduction of ICT-supported methods and pedagogical practices, and for planning the implementation of flexible learning in UL study programmes.

Data from the DiUL survey were used to explore university teachers' use of ICT with a particular focus on how it correlated with age. Namely, many studies have considered factors that affect HE teachers' use of ICT, for instance, the quality of the system and service together with self-efficacy (Wang & Wang, 2009), perceived usefulness, perceived ease of use, computer anxiety, computer knowledge, normative pressure and management support (Al-alak & Alnawas, 2011), the level of satisfaction with the ICT and the learning management system (Al-Busaidi & Al-Shihi, 2012), teaching improvement, pragmatism and external pressure (Backhouse, 2013), perceived usefulness, perceived ease of use and system quality (Motaghian et al., 2013), and effort expectancy, facilitating conditions and social influence (Kocaleva et al., 2015). These studies show that these factors can influence HE teachers' willingness to use ICT. Other studies have examined the relationship between HE teachers' ICT use and certain demographic features, such as gender (Agboola, 2006; Alkhasawneh & Alanazy, 2015; Bhat & Bashir, 2018; Okazaki & Renda dos Santos, 2012; Soydal et al., 2011; Tena et al., 2016). However, not much literature can be found on the effect of age on HE teachers' ICT use. Accordingly, the following research question was posed:

To what extent is university teachers' age correlated with their self-reported educational and personal use of ICT?

The DiUL survey provided data on teachers' ICT use in their face-to-face, blended or online courses, and their personal ICT use. It was hypothesised that there would be a correlation between university teachers' age and their self-reported use of ICT, and that younger teachers would be more likely to use ICT for educational and personal purposes.

The first section of the paper reviews literature on the effects of age on ICT use in HE instruction. The next sections outline the methodology employed in the research on UL teachers' ICT use and present the results. The final section discusses the findings and certain future implications.

2. Literature review

Research on the relationship between age and teachers' adoption of ICT is inconclusive. When looking at some secondary education inquiries, one can see that some point to age differences while others do not. Kuskaya Mumcu and Kocak Usluel (2010, p. 104) analysed teachers from Turkish vocational and technical schools and found that the younger the teachers were, the more they used ICT. Similar results were obtained by

Zyad (2016, p. 74) whose study of Moroccan secondary school teachers also showed a correlation between attitude to ICT and age, revealing that younger teachers are more likely to use ICT in their teaching. Likewise, in their research of upper secondary school teachers Krumsvik et al. (2016, p. 157) found that teachers who are 50 or older have less digital competence. In contrast to these studies, Semerci and Aydin's (2018, p. 101) study of Turkish secondary school teachers' use of ICT did not detect any significant differences between teachers in terms of age.

Fewer studies are available on how academic staff's age is related to ICT adoption. These studies mainly cover Asian, African and Arab countries. One reason for the higher number of research publications on the implementation of ICT in HE in these regions might be that in Asia one can find initiatives for the promotion of e-education via public projects, the state in Arab countries gives incentives for e-education, and in Africa mobile telephony and the spread of social networks are fostering change (Bregar et al., 2017, p. 9).

More recent studies on the correlation between academic staff's age and e-learning adoption include Alkhasawneh and Alanazy's (2015, p. 494) examination of how academic staff at a university in Saudi Arabia adopted and used ICT. Using Venkatesh et al's UTAUT – Unified Theory of Acceptance and Use of Technology model (Venkatesh et al., 2003) the authors did not find any significant differences among the staff based on age. They believed this was due to ICT use having become normalised. Unlike them, Soydal et al. (2011, p. 287) obtained different results. They analysed academic staff from a Turkish university and established that age was a factor in their readiness to adopt e-learning, and that younger staff used the Internet and office software more confidently.

As regards HE teaching staff, some studies point to age differences with regard to ICT use while others do not. For example, in his study of teaching staff in HE institutions in Egypt, Elsaadani (2013) found considerable age-related differences in attitudes to ICT. Similarly, a relatively recent survey on university teachers in the Indian context by Bhat and Bashir (2018) reveals that age has a significant influence on teachers' view of the pedagogical usefulness of ICT. Younger respondents (aged up to 40 years) more strongly believed that ICT made their work easy and had improved their knowledge as opposed to their older colleagues. Another study conducted by Lin et al. (2014) shows similar results. The authors studied barriers to ICT adoption among university teachers of Chinese as foreign language from five US states. They found that younger teachers displayed more confidence in integrating ICT into their teaching. Similarly, Guillén-Gámez and Mayorga-Fernández (2020, pp. 9-11) in their analysis of Spanish higher education teachers found that age was an influential variable and a predictor of the overall attitude towards ICT use.

In contrast to these studies, several authors found no age-related differences between HE teachers in terms of ICT use. For instance, an examination of Nigerian teacher educators from teacher education colleges and universities conducted by Jegede (2009) revealed their age was not related to their attitudes to ICT, to their ICT competence or to the way they used ICT. A few years later, Mahdi and Al-Dera (2013) also could not identify any significant differences between younger and older EFL instructors teaching English as foreign language at a university in Saudi Arabia. A relatively recent study of university as well as primary and secondary school teachers also did not detect any age-based differences in ICT use (Suárez-Rodríguez et al., 2018).

Despite the growing number of authors, empirical research on how age relates to ICT use in a HE context remains scarce and rather inconclusive. The present study intends to contribute to closing this data gap.

3. Method

This research aimed to examine the effect age exerts on the way UL teachers use ICT. For this purpose, the DiUL project survey data were used. This survey included teaching staff from 23 faculties and 3 academies, which are independent institutions and differ in terms of their strategy, provision, and support for ICT-supported instruction. As of spring 2020, the UL does not issue any common guidelines and thus ICT-supported teaching is developed and performed mostly by individual enthusiasts. The teaching staff positions ranged from assistants to full professors, and they were from all disciplines within social, applied and natural sciences as well as humanities.

The invitation for survey participation was sent via email by the general UL office to the work email addresses of all 2,682 teachers employed by the UL, with a link to the questionnaire and some explanatory text with information about the DiUL project. The survey was anonymous. Participants were asked to use a standard Likert scale to evaluate 68 statements. The scales used a 5-point Likert-type scale, with the following responses: from 1 – 'disagree very strongly' to 5 – 'agree very strongly' (e.g. while expressing dis/agreement), from 1 – 'never' to 5 – 'very often' (e.g. to say how often they use ICT in teaching), and from 1 – 'once a year/never' to 5 – 'every day' (e.g. to indicate how often they use ICT at home).

Out of 960 responses obtained, 559 were discarded for being invalid due to low completion rate which may be attributed to a large number of questions in the survey. Many respondents quit before completing the last section that contained questions regarding personal ICT use which was the focus of our study. In addition, 27 responses that did not answer the question about the year of birth were omitted.

Thus, with 401 complete responses, the final response rate was 15%, which is reliable enough to report our results with a confidence level of 95%, indicating that the true value lies within ±5% of the measured value (the minimum calculated value for this confidence level is 337 responses) (Taherdoost, 2017). The items related to the use of technology and tools indicate an acceptable value of .671 for Cronbach's Alpha reliability estimator, computed with correlations between all pairs of items. Cronbach's Alpha for items related to most common ICT-supported pedagogical activities is .80, indicating even a very good level (Ursachi et al., 2015).

Demographic data were also collected, such as gender, age, educational qualification, classification of their educational field, academic title and the faculty that employs the respondents. The UL teaching staff's gender composition is 40% female, 60% male. The selection made of valid and complete records comprised an equal number of females and males (Table 1) showing an adequate level of composition similarity.

Table 1
Demographic profile of the respondents

	Gender		Age			
	Female	Male	21 – 40	41 – 50	51 – 55	55+
N	199	202	91	166	73	71
Percentage	49.6%	50.4%	22.7%	41.3%	18.2%	17.7%

4. Results

The basic statistic indicates that UL teachers use a range of ICT tools in their instruction. They most frequently use presentation slides and online resources, such as online books and articles, as well as bibliographic databases available to teachers and students, and less commonly use recorded video lectures. There is a dividing line between teachers who use learning management systems (LMS) frequently and those who do not use them at all. To communicate with their students, UL teachers frequently use email or online forums and the like whereas they only rarely use social networking services such as Facebook, Twitter or Instagram. Online collaboration tools are ranked somewhere in the middle. The most common ICT-supported pedagogical activities are introducing the lesson and delivering the lecture, less common ones include revising knowledge or motivating students, while the least frequent are prior knowledge evaluation, knowledge testing, and assessment (Table 2).

Table 2
Distribution of answers (in percentage)

	Never	Rarely	Sometimes	Often	Very often
Use of presentation with slides	7%	4%	6%	12%	71%
Use of online video lectures	25%	24%	25%	15%	11%
Use of online resources (books, articles …)	3%	11%	23%	33%	30%
Use of LMS	22%	13%	13%	14%	38%
Use of bibliographic databases	8%	13%	19%	28%	31%
Use of communication tools (email, online forums …)	2%	3%	7%	23%	65%
Use of social networking services (Facebook, Twitter …)	58%	15%	13%	7%	6%
Use of collaboration tools (wikis, Google Drive, Dropbox …)	18%	21%	28%	20%	14%
Introducing content	4%	7%	15%	28%	46%
Evaluating prior knowledge	26%	28%	26%	15%	5%
Motivating students	6%	10%	26%	42%	16%
Lecturing	2%	6%	16%	37%	38%
Revising knowledge	9%	11%	31%	31%	19%
Testing knowledge	28%	26%	26%	15%	5%
Assessing knowledge	41%	20%	23%	11%	5%

We grouped respondents into five almost-equal age groups (Table 3). To test the influence of age on different indicators, we used the Kruskal-Wallis H test since we have ordinal dependent variables, an independent variable with several categorical and independent groups and independence of observation.

The Kruskal-Wallis H test provided strong evidence of a difference in the mean ranks of some indicators (*p*-values less than 0.05 in Table 4) for at least one pair of groups. Dunn's pairwise tests were carried out for five pairs of groups.

Table 3
Age groups

		Frequency	Valid Percent	Cumulative Percent
Valid	21–40	91	22.7	22.7
	41–45	84	20.9	43.6
	46–50	82	20.4	64.1
	51–55	73	18.2	82.3
	55+	71	17.7	100.0
	Total	401	100.0	

Table 4
Responses from age groups

Indicator	Mdn-40	Mdn41-45	Mdn46-50	Mdn51-55	Mdn55+	p	H-statistic
Use of presentation slides	5.00	5.00	5.00	5.00	5.00	.022	11.408
Use of online video lectures	3.00	3.00	3.00	3.00	2.00	.245	5.443
Use of online resources (books, articles …)	4.00	4.00	4.00	4.00	4.00	.381	4.186
Use of LMS	4.00	4.00	3.00	3.00	4.00	.669	2.363
Use of bibliographic databases	4.00	4.00	4.00	4.00	4.00	.013	12.646
Use of communication tools (email, forums …)	5.00	5.00	5.00	5.00	5.00	.198	6.012
Use of social networking services (Facebook, Twitter …)	1.00	1.00	1.00	1.00	1.00	.618	2.648
Use of collaboration tools (wikis, Google Drive …)	3.00	3.00	3.00	3.00	3.00	.179	6.277
Personal use of ICT for entertainment (music, movies, etc.)	4.00	4.00	3.00	3.00	2.00	<.001	51.836
Personal use of ICT for getting information, news	5.00	5.00	5.00	4.00	4.00	.034	10.448
Personal use of ICT for communication (email, chat, video calls etc.)	5.00	5.00	5.00	5.00	5.00	.698	2.204
Personal use of ICT for social networking	4.00	3.00	3.00	2.00	2.00	<.001	23.621

Note. Mdn-40 – Median (age group 21–40); Mdn41-45 – Median (age group 41–45); Mdn46-50 – Median (age group 46–50); Mdn51-55 – Median (age group 51–55); Mdn55+ – Median (age group 55+); p – asymptotic p-value

With the Use of presentation slides indicator, we detected a pairwise difference between groups 21–40 and 41–45 ($p = .016$), although the median value was equal. In the case of the indicator Use of bibliographic databases, we found a pairwise difference ($p = .010$) between groups 21–40 and 55+ but, once again, the median values are equal. We therefore cannot prove any differences among the medians for the use of ICT in academic processes regarding age groups. However, we detected median differences in

the digital background indicators. Considering the Personal use of ICT for entertainment (music, movies, etc.) indicator, 5 group pairs indicate a significant difference (41–45 vs. 51–55+, 21–40 vs. 55+, 41–45 vs. 51–55, 21–40 vs. 51–55 and 21–40 vs. 46–50), showing the younger age groups to be more frequent users. With the indicator of Personal use of ICT for getting information, news, no pairwise differences were detected. The last indicator for which a between-group difference was detected is Personal use of ICT for social networking, revealing a significant pairwise difference between groups 21–40 vs. 55+ and 21–40 vs. 51-55, again in favour of the younger age group.

Fig. 1 below shows the relationship between frequency of personal use of ICT and age groups. Values from 1 to 5 indicate frequency of use ranging from "never" to "very often", while the colours show the age groups (blue - age group 21–40, red - age group 41–45, green - age group 46–50, orange - age group 51–55, yellow - age group 55+). Age-related differences are evident in Personal use of ICT for entertainment (music, movies, etc.) where the youngest age group (blue bar) has the strongest relationship, while the oldest age group (yellow bar) does not use ICT often. Results for Personal use of ICT for getting information, news shows the strongest set of answers is "very often" for all age groups, representing over half the responses of the three youngest age groups, while for the two older age groups it accounts for around one-third of the responses. Personal use of ICT for communication (email, chat, video calls etc.) is almost a routine daily task for all age groups. The personal use of ICT for social networking chart shows the youngest age group uses ICT for social networking significantly more than the other age groups. Members of this group use it every day. Interestingly, the number of those who do not use ICT to socially network is almost the same in all age groups, including quite a considerable share of the youngest teachers.
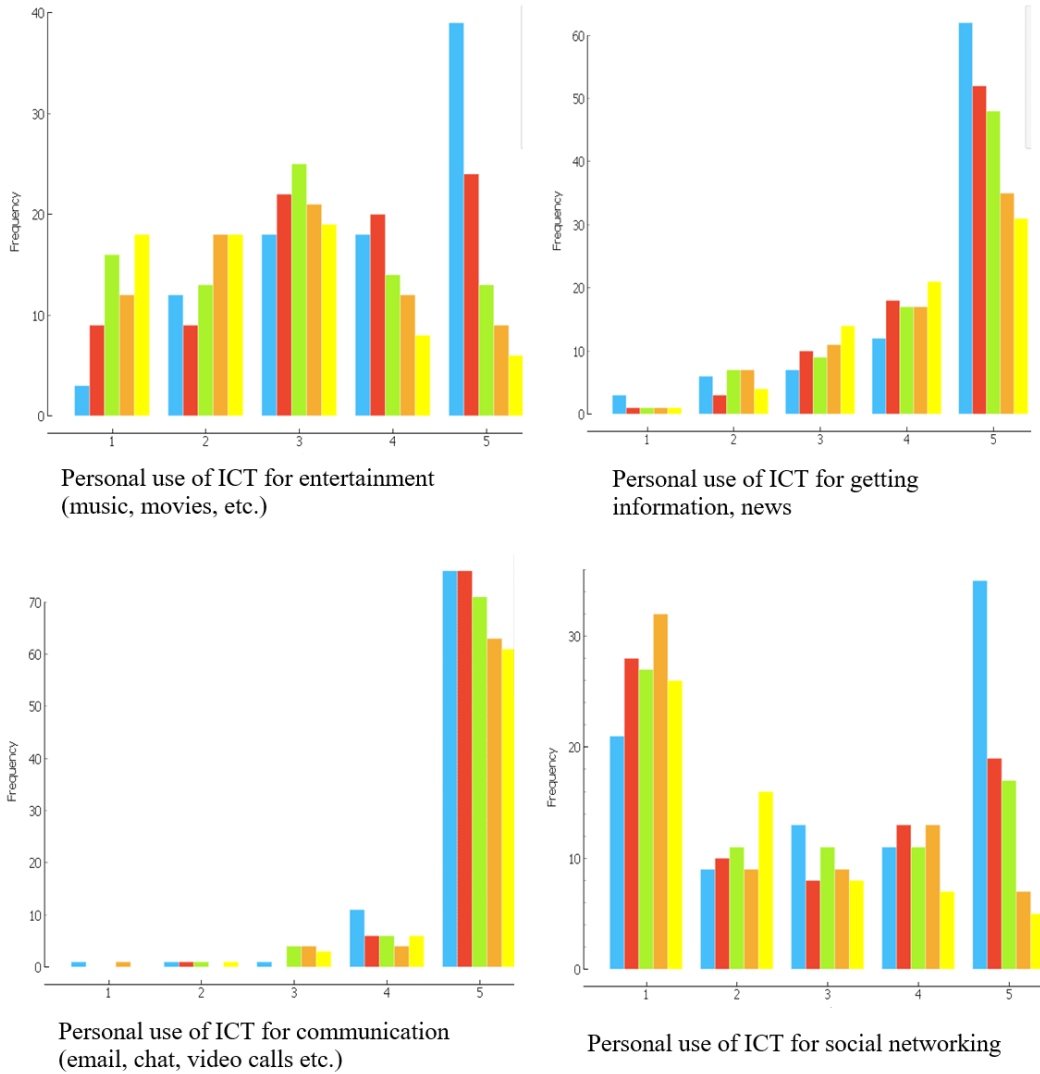
5.   Discussion and conclusion

The aim of the research was to establish whether there is any correlation between UL teachers' age and their self-reported educational and personal use of ICT. The results show there are no age differences in their instructional use and a few in their personal ICT use.

With regard to using ICT for instruction, no significant age differences were detected for most uses such as use of online video lectures, online resources (books, articles …), LMS, communication tools (email, forums …), social networking services (Facebook, Twitter …) and collaboration tools (wikis, Google Drive …). The statistical tests revealed significant differences in the use of presentation slides and bibliographic databases, but since their medians are the same these two uses also do not show any age differences. We may thus conclude that there are no significant differences among age groups of UL teachers with regard to instructional ICT use.

Yet UL teachers differ with respect to certain personal ICT uses. Younger UL teachers use ICT for entertainment (music, movies etc.) and for social networking significantly more than their older counterparts. Using ICT to obtain information and for communication (email, chat, video calls etc.) is now normal for all age groups, meaning there are no significant differences in this use.

The COVID-19 pandemic has led to a need for more in-depth research into various aspects of ICT use in HE. This analysis has shown that older UL teachers are not lagging behind their younger colleagues in instructional ICT use. This may mean that they have successfully acquired the digital skills required for university teaching. Future

research could investigate if there are any age differences in their ICT teaching methods, especially during the COVID-19 pandemic. In addition, more light could be shed on the ways the older teachers managed to acquire the necessary ICT skills and thereby successfully catch up with their younger counterparts.

Personal use of ICT for entertainment (music, movies, etc.)

Personal use of ICT for getting information, news

Personal use of ICT for communication (email, chat, video calls etc.)

Personal use of ICT for social networking

Note. Blue - age group 21–40; red - age group 41–45; green - age group 46–50; orange - age group 51–55; yellow - age group 55+; 1 - Never; 2 - Rarely; 3 - Sometimes; 4 - Often; 5 - Very often

Fig. 1. Personal ICT uses

Based on our analysis, one may also assume that younger UL teachers may more easily understand their students in terms of social media use and online entertainment. They may have a deeper insight into how students communicate and network online as well as which media products they consume. Future research could examine whether this affects younger UL teachers' methods of instruction and achievement of pedagogical goals.

A limitation of this study is that the sample comes from a single Slovenian university. Data from other universities were not available as the research was conducted as part of a UL project. A broader data set that includes more universities should be used. Future research on university teachers' ICT use with a larger sample could explore the correlation between age and other demographic data. Despite the problem with generalisation this creates, we hope this research can assist the UL's recently established centre for ICT-supported pedagogy in better planning teacher support, training, evaluation, and quality assurance for teaching and learning.

Author Statement

The authors declare that there is no conflict of interest.

Acknowledgements

ORCID

Damijana Keržič https://orcid.org/0000-0003-4505-7134

Manica Danko https://orcid.org/0000-0003-4492-3811

Vida Zorko https://orcid.org/0000-0003-1506-7171

Mitja Dečman https://orcid.org/0000-0003-3395-4452

References

Agboola, A. K. (2006). Assessing the awareness and perceptions of academic staff in using e-learning tools for instructional delivery in a post-secondary institution: A case study. *The Innovation Journal: The Public Sector Innovation Journal, 11*(3): 4.

Al-alak, B. A., & Alnawas, I. A. M. (2011). Measuring the acceptance and adoption of e-learning by academic staff. *Knowledge Management & E-Learning, 3*(2), 201–221.

Al-Busaidi, K. A., & Al-Shihi, H. (2012). Key factors to instructors' satisfaction of learning management systems in blended learning. *Journal of Computing in Higher Education, 24*, 18–39.

Alkhasawneh, S., & Alanazy, S. (2015). Adopt ICT among academic staff in Aljouf University: Using UTAUT model. *Mediterranean Journal of Social Sciences, 6*(1), 490–494.

Backhouse, J. (2013). What makes lecturers in higher education use emerging technologies in their teaching? *Knowledge Management & E-Learning, 5*(3), 345–358.

Bhat, S. A., & Bashir, M. (2018). Measuring ICT orientation: Scale development & validation. *Education and Information Technologies, 23*, 1123–1143.

Bregar, L., Puhek, M., & Zagmajster, M. (2017). *Analiza stanja na področju digitalizacije in e-izobraževanja v visokem šolstvu v Sloveniji* [Current state analysis

of digitalisation and e-learning in higher education in Slovenia]. Maribor: DOBA Fakulteta.

Elsaadani, M. A. (2013). Exploring the relationship between teaching staff' age and their attitude towards information and communications technologies (ICT). *International Journal of Instruction, 6*(1), 215–226.

Gaebel, M., Kupriyanova, V., Morais, R., & Colucci, E. (2014). *E-learning in European higher education institutions: Results of a mapping survey conducted in October-December 2013*. Brussels: European University Association.

Guillén-Gámez, F. D., & Mayorga-Fernández, M. J. (2020). Identification of variables that predict teachers' attitudes toward ICT in higher education for teaching and research: A study with regression. *Sustainability, 12*(4): 1312.

Jegede, P. O. (2009). Age and ICT-related behaviours of higher education teachers in Nigeria. *Issues in Informing Science and Information Technology, 6*, 770–777.

Kocaleva, M., Stojanovic, I., & Zdravev, Z. (2015). Model of e-learning acceptance and use for teaching staff in higher education institutions. *International Journal of Modern Education and Computer Science, 7*(4), 23–31.

Krumsvik, R. J., Jones, L. Ø., Øfstegaard, M., & Eikeland, O. J. (2016). Upper secondary school teachers' digital competence: Analysed by demographic, personal and professional characteristics. *Nordic Journal of Digital Literacy, 11*(3), 143–164.

Kuskaya Mumcu, F., & Kocak Usluel, Y. (2010). ICT in vocational and technical schools: Teachers' instructional, managerial and personal use matters. *Turkish Online Journal of Educational Technology - TOJET, 9*(1), 98–106.

Lin, C. Y., Huang, C. K., & Chen, C. H. (2014). Barriers to the adoption of ICT in teaching Chinese as a foreign language in US universities. *ReCALL: the Journal of EUROCALL, 26*(1), 100–116.

Mahdi, H. S., & Al-Dera, A. S. (2013). The impact of teachers' age, gender and experience on the use of information and communication technology in EFL teaching. *English Language Teaching, 6*(6), 57–67.

Ministry of Education, Science and Sport. (2011). *Resolucija o nacionalnem programu visokega šolstva 2011–2020* [Resolution on National programme of higher education 2011–2020]. Slovenia. Retrieved from https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/103885

Ministry of Education, Science and Sport. (2016). *Strateške usmeritve nadaljnjega uvajanja IKT v slovenske VIZ do leta 2020* [Strategic guidelines for further implementation of ICT in Slovenian HE institutions until 2020]. Slovenia.

Motaghian, H., Hassanzadeh, A., & Moghadam, D. K. (2013). Factors affecting university instructors' adoption of web-based learning systems: Case study of Iran. *Computers & Education, 61*, 158–167.

Okazaki, S., & Renda dos Santos, L. M. (2012). Understanding e-learning adoption in Brazil: Major determinants and gender effects. *International Review of Research in Open and Distributed Learning, 13*(4), 91–106.

Semerci, A., & Aydin, M. K. (2018). Examining high school teachers' attitudes towards ICT use in education. *International Journal of Progressive Education, 14*(2), 93–105.

Soydal, İ., Alır, G., & Ünal, Y. (2011). Are Turkish universities ready for e-learning: A case of Hacettepe University Faculty of Letters. *Information Services & Use, 31*(3/4), 281–291.

Suárez-Rodríguez, J., Almerich, G., Orellana, N., & Díaz-García, I. (2018). A basic model of integration of ICT by teachers: Competence and use. *Educational Technology Research and Development, 66*(5), 1165–1187.

Taherdoost, H. (2017). Determining sample size; How to calculate survey sample size. *International Journal of Economics and Management Systems, 2*, 237–239.

Tena, R. R., Almenara, J. C., & Osuna, J. B. (2016). E-learning of Andalusian

University's lecturers. *Turkish Online Journal of Educational Technology, 15*(2), 25–37.

Ursachi, G., Horodnic, I. A., & Zait, A. (2015). How reliable are measurement scales? External factors with indirect influence on reliability estimators. *Procedia Economics and Finance, 20*, 679–686.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Towards a unified view. *MIS Quarterly, 27*(3), 425–478.

Wang, W. T., & Wang, C. C. (2009). An empirical study of instructor adoption of web-based learning systems. *Computers & Education, 53*(3), 761–774.

Zyad, H. (2016). Integrating computers in the classroom: Barriers and teachers' attitudes. *International Journal of Instruction, 9*(1), 65–78.