University Students' Use and Preferences of Digital Technology in the Peruvian Highlands

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Abstract. In recent literature, there has been much discussion about student use of digital technology for academic and learning purposes undertaken in most developed countries. However, most of the empirical literature has ignored developing countries like Peru. This paper reports on research into how first-year university students communicate, their general study habits, and how digital technologies are used to support academic activities. A quantitative approach using a descriptive design is proposed for this study. A convenience sample of 201 students from a variety of backgrounds (cultural, social and economic) participated in the study. The findings evidence that learners' technology use in this university is considerably more constrained than "Net generation" discourse suggest. Participants are not making good uses of digital technologies that "work best" for them taking in consideration they were enrolled in online instructional modality. Further investigations are recommended to find out the reasons behind these findings.

Keywords: Digital technology, social media, smartphone, Peru

1 Introduction

The digital age has a significant influence on the ways educational institutes and higher education establishments function [1]. However, what distinguishes the digital age from all previous ages is that the pace of technology advancements speeds up [2]. The increase in the use of digital technologies has had a significant impact on society and is leading to massive changes in the way we live, work, think, learn, communicate and relate to each other [2], [3]. Digital technology refers to a wide range of technologies which store and transmit information in digital form and could be hardware-based or software-based [4, 5]. Digital technologies are integral to the future of higher education settings in all developed countries [6, 7].

In most developed countries, technology has penetrated every classroom [8] and it is embedded into university students' lives [9], [10]. Learners who have grown up

grown up with technology are coming to our educational institutions with a range of digital skills and achievements using a variety of digital tools [11]. They are generally inclined to use and to have favorable attitudes toward technology [10]. Most recently, the popularization of social media (e.g. YouTube, Facebook, Twitter, and Edmodo) [12], [13] and mobile messaging applications (e.g. Kik, Snapchat, and WhatsApp) [14] have changed this landscape even further [12], [14] and have attracted millions of users, especially college students [11]. On average, undergraduate students continually update features and spend more over 6 hours per week using social media sites, primarily through their mobile devices (e.g. smartphone) [13], [15]. However, the same cannot be said for many developing countries like Peru which have limited access to digital technologies and restricted opportunities for their use [11].

In recent literature, there has been much discussion about student use of digital technology for academic and learning purposes undertaken in most developed countries: e.g. in Australia [6, 7, 16], Canada [17–19], China [20], Germany [21], Spain [22, 23], Sweden [24], Switzerland [25, 26], United Kingdom [27, 28], United States [29] and others. However, most of the empirical literature has ignored developing countries like Peru. There is a lack of research in Peruvian universities on the relationship between the use of digital technologies and how students currently use them to learn, work, create and engage in a society which is shaped by them [11, 30, 31].

Peru, a multi-racial, multi-linguistic, multi-cultural and multi-ethnic country is a developing country located in South America; with a population today of more than 31 million, of which more than 60% is mestizo [32]; and, only 28% of Peruvian households had an Internet connection [33]. In Peru, the percentage of the population aged 15 years and older enroll in higher education is currently 19.7%, according to the National Household Survey 2017 [32], which is below the average in the Latin American region, where the gross enrolment ratio in higher education is 41%; nevertheless, there are serious concerns about the quality and performance of these institutions [34].

In 2014, the Peruvian government approved the new University Law N° 30220 [35] to begin a process of reform of quality assurance for higher education and to implement significant changes in the policy structure. This government initiative is in line with other countries in the region (e.g. Chile and Colombia) that carried out procedures directed towards to assess and improve their higher education institution's standards [36].

Peru maintains 21.7% of poverty and 3.8% % of extreme poverty; meanwhile Junin - where this study was conducted - poverty fluctuates between 23% and 26.2% and extreme poverty fluctuates between 4.7% y 6.5% [37]. Junin is a region located in the central highlands of Peru, and his capital is Huancayo at 3,271 metres above sea level, that belongs to the Quechua region where official languages are Spanish and Quechua.

With these issues in mind, this paper sheds new light on what and how, learners possess, use and learn with technology. Thus, this paper reports on research into how first-year university students communicate, their general study habits, and how digital technologies are used to support academic activities.

2 Methodology

This research takes place within an international research project, "Digital Learners in Higher Education" (http://digitallearners.ca) that is investigating how postsecondary learners in different institutional contexts and cultures think about digital technologies and how they use them in their social and educational lives. A quantitative approach using a descriptive design is proposed for this study [38] to become more familiar with phenomena and to gain new insight [39].

Data collection took place in a private university located at Huancayo city in the Mantaro Valley of Junin Region, in the central Andes of Peru. The university offers both face-to-face learning and an internet-based learning system. The inclusion criteria included: (a) Peruvian students enrolled in online instructional modality, (b) being aware of time and place, (c) willingness to participate in research, and (d) being Spanish-speaking respondents. A convenience sample of 201 students participated in the study. Students come from a variety of backgrounds (cultural, social and economic) within Peru.

The "Survey of Student Communication & Study Habits", developed by Bullen and colleagues [40] in Canada, was used as the data collection method. The online questionnaire uses a four point Likert scale with options ranging with 74 items. The survey instrument included demographic information; how and where first-year students communicates with peers and professors; and, their study habits.

For use in a new country, language and culture, the questionnaire was adapted and translated to Spanish by experts from the "Universitat Oberta de Catalunya" (UOC), a Spanish open online university [22]. The terminology of this Spanish version was adapted to the Peruvian context, by some professors and proofreaders of the "Oficina de Virtualización de Contenidos" who gave their expert advice in respect of the pragmatic language level and the appropriateness of the questionnaire. The process of adapting this survey considers (a) the appropriateness of each item of the original instrument in terms to represent such concepts in the Peruvian target population; and, (b) the semantic, linguistic, and contextual equivalence between the original and the translated items [41, 42]. For example, in Spain, cellphone is translated as "teléfono móvil", but in Peru (also in all Latin America) is translated as "celular".

The questionnaire was self-administered and lasted an average of 30 minutes. The data were processed using the software IBM SPSS Statistics, version 25. The Cronbach's alpha reliability values for the items was .943, indicating a high level of reliability.

2.1 Ethical Considerations

Permission to reproduce and use the research instrument was granted from the authors. Information about the research question, aim and the benefits of the study was included in the information letter. The completion of the questionnaire was considered as informed consent. Prior to taking the survey, the students were told that their responses were anonymous and they were kept in a safe place where only the main researcher and authors had access.

3 Findings and Discussions

Students' ages ranged from 17 to 59 (mean of 29.36 and standard deviation of 10.09) and 58.2% were males. Respondents were all first-year students of the Faculty of Engineering (43.3%), Faculty of Health Sciences (6.5%), Faculty of Law (9%), Faculty of Business Sciences (36.8%) and Faculty of Humanities (4.5%).

Students were asked to indicate their views about what they do when they have a doubt about their courses' content (Table 1). According to their responses, students prefer not to talk to a professor (76%) and classmates (75%). Most of them are reluctant to talk to a tutor, coordinator (67%), work colleague (81%) and others students not in the program (84%). Over half (57%) of the students prefer search online. The majority (79%) of them try to address it on their own. Consistent with previous studies [11], [43]; these findings suggest that participants were likely to use of informal help sources (search online and try to address it by themselves). However, they did not prefer formal resources (professor, tutor and coordinator). It is unclear why they are not seeking help from formal channels, but institutions, institutional leaders and policy makers need to acknowledge that learners are using informal help-seeking options more than institutional channels [11], [43].

Table 1. What students do when they have a question course's content.

Preferences	N	S	O	A	M	SD
a. Talk to a professor	24%	52%	19%	5%	2.06	0.804
b. Talk to a classmate	42%	33%	18%	6%	1.90	0.924
c. Talk to a tutor, coordinator, etc.	26%	41%	25%	7%	2.13	0.893
d. Talk to others students not in the program	56%	28%	12%	4%	1.65	0.848
e. Talk to another person (e.g. family, friends, etc.)	17%	38%	32%	13%	2.40	0.923
f. Search online	5%	38%	35%	22%	2.74	0.856
g. Talk to a work colleague	44%	37%	13%	5%	1.80	0.872
h. Try to address it on my own (e.g. read the course material)	2%	19%	46%	33%	3.09	0.772

Note. Scale: N=Never, S=Seldom. O=Often, A=Always, M=Mean, SD= Standard deviation

Students were asked to indicate how often students use digital technologies (e.g. e-mail, SMS or instant messaging, social networks, videoconferencing using Skype and Moodle) to communicate with classmates and professors about courses. The majority of students do not preferred face-to-face discussions with classmates (72%) and professors (72%). This finding is in contrast to previous studies [11], [44], which found face-to-face was faster and more effective channel of communicating with professors for course-related matters than using digital technologies. To communicate with their professors and classmates, most of students do not preferred e-mail (institutional and personal), instant messages, text message, social networks and videoconfering systems (Table 2).

These respondents are not using a variety of technologies and this result contradicts the "Net generation" discourse [45] who have been characterized as being confident,

familiar with and comfortable using technology [46]. Most students come to the university with few digital skills and the majority of them do not have sufficient levels of competence across a wide range of devices and applications. Generally speaking, digital competence consists of the skills and practices that people should have to use and apply digital technologies in a meaningful way for learning, working and leisure time in a knowledge society [47]. Most Peruvians students do not develop sufficient digital competence during upper secondary school and are not able to take care of their own learning activities with technology. It seems that both home environment, school and individual preferences seem to play an important role on digital competence [47, 48].

Besides, these learners did not use the advantages that that mobile devices allow; especially in relation to relationships (peers, classmates, family, relatives). In recent years, smartphones represent an important part of students' life, but these students are not taking full advantage to get in touch with their classmates and professors; especially if they are taking online classes. They could stay connected with them through different numerous smartphone applications that generally offer fast and cost-effective communication [49]. These results highlight that students have access to a few digital tools and are not open to using digital technology for academic learning and achievement.

Table 2. Student communication preferences with classmates and professors.

Preferences	Type	N	S	O	A	M	SD
a. Institutional e-mail account	Classmates	15%	42%	26%	17%	2.30	1.205
	Professors	12%	32%	36%	20%	2.53	1.175
b. Personal e-mail account (e.g. Hotmail, Gmail)	Classmates	30%	33%	25%	11%	1.87	1.383
	Professors	44%	30%	17%	8%	1.45	1.410
c. Instant messaging (e.g. MSN, WhatsApp)	Classmates	23%	29%	21%	26%	2.27	1.463
	Professors	62%	24%	6%	7%	0.97	1.336
d. Text message via cellphones	Classmates	37%	33%	18%	11%	1.66	1.417
	Professors	66%	22%	8%	4%	0.85	1.241
e. Social networks (LinkedIn, Facebook, Twitter)	Classmates	58%	27%	10%	5%	1.03	1.305
	Professors	71%	22%	4%	3%	0.69	1.133
f. Videoconferencing systems (e.g. Skype, Hangouts)	Classmates	35%	35%	18%	12%	1.72	1.408
	Professors	62%	23%	9%	5%	0.96	1.309
g. Talking via phone	Classmates	29%	36%	21%	14%	1.92	1.394
	Professors	58%	25%	10%	7%	1.07	1.364
h. Talking in person	Classmates	31%	41%	23%	5%	1.72	1.270
	Professors	42%	30%	19%	8%	1.51	1.404
i. Moodle (forum, wiki, chat)	Classmates	12%	38%	32%	18%	2.44	1.152
	Professors	15%	29%	36%	20%	2.47	1.249

Note. Scale: N=Never, S=Seldom. O=Often, A=Always, M=Mean, SD= Standard deviation

Regarding the students' study habits (Table 3), 66% of students prefer to work on assignments on their own when doing homework and assignments; 66% prefer to learn by themselves; and, 67% prefer not study with friends. This finding is in contrast to the prevailing "Net generation" discourse [38], which suggests learners are characterized as confident and team-oriented [50]. Besides, 52% of participants are not doing several different tasks at the same time. This result contradicts the prevailing "Net generation" discourse [45], which suggests today's higher education students are not only multitasking (being engaged in several tasks simultaneously). Students (78%) prefer clear instructions before trying something new. Consistent with other studies [7], [51], learners need detailed instructions or guidelines with specific goals, tasks, deadlines, and guidelines in order to achieve expected learning outcomes.

Table 3. Student's study habits.

Preferences	N	S	O	A	M	SD
a. Work on my own	8%	26%	32%	34%	2.92	0.956
b. With friends	25%	42%	26%	7%	2.15	0.876
c. Learn for myself	8%	28%	34%	30%	2.86	0.938
d. Get clear instructions	4%	18%	35%	43%	3.16	0.865
e. Used to doing several different tasks	17%	35%	28%	19%	2.50	0.991

Note. Scale: N=Never, S=Seldom. O=Often, A=Always, M=Mean, SD= Standard deviation

5 Conclusions

The students do not fit in the digital generation profile. The findings evidence that learners' technology use in this university is considerably more constrained than "Net generation" discourse suggest. Most digital technologies are not an integral part of their students' lifestyles in higher education and their use for academic purposes is limited. In this study, participants are not making good uses of digital technologies that "work best" for them taking in consideration they were enrolled in online instructional modality. Further investigations are recommended to find out the reasons behind these findings and to systematize knowledge about how to understand learner's digital competence. The authors suggest that it is important to identify the important role that this institution have to play in assisting learners in appropriating and making effective use of digital technologies. This could be a way of addressing the impact of the digital age on teaching and learning.

This study outlines the validation and cultural adaptation of the "Survey of Student Communication & Study Habits" to the Peruvian context. To our knowledge, this is the first study that attempted to assess the validity and reliability of this survey in the Peruvian context. This version of the survey has good internal consistency. The practical implication of this study shows that in cross-cultural studies, the use of

instruments that are merely translated does not to ensure consistent, reliable and accurate results [41].

One of the limitations of this study is the convenience sampling method that limits the generalizability of the findings. This study only investigated a small sample from one university in one region of Peru. The data were collected in Junin (Peru), and thus the generalizability of the findings to other international contexts warrants further assessment. Future studies should consider using a more geographically diverse samples. Nonetheless, this is an initial exploration of university students' communication and their study habits, and the selected sample and instruments used are helpful in achieving this research goal.

This paper has sought to contribute to a growing body of literature of research studies in to date in Latin America and the findings highlight differences between Peruvian university students in our sample (Junin) and previous studies from developed countries. These findings give a picture of the study habits and the use of digital technology among Peruvian university learners, and what are the implications of their use for Higher Education, but further studies should include informants with more diverse backgrounds in Peruvian universities.

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References

1. Corey, L.: A Case Study of iPad Implementation in One Rural Elementary School. J. Educ. Technol. Syst. 004723951986299 (2019). https://doi.org/10.1177/0047239519862999.
2. Bates, A.: Teaching in a Digital Age: Guidelines for designing teaching and learning for a digital age. Tony Bates Associates Ltd., Vancouver, BC (2015).
3. Gallardo-Echenique, E., Bullen, M., Marqués-Molías, L.: An approach to digital learners in a Catalonian public face-to-face university. In: Paper presented at ECER 2014: The Past, Present and Future of Educational Research in Europe. , Porto (2014).
4. Hague, C., Williamson, B.: Digital participation, digital literacy and school subjects: A review of the politicies, literature and evidence. , Bristol, UK (2009).
5. Abbott, C.: E-inclusion: Learning difficulties and digital technologies (Report 15). , Bristol, UK (2007).
6. Henderson, M., Selwyn, N., Aston, R.: What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. Stud. High. Educ. 42, 1567–1579 (2017). https://doi.org/10.1080/03075079.2015.1007946.
7. Henderson, M., Selwyn, N., Finger, G., Aston, R.: Students' everyday engagement with digital technology in university: exploring patterns of use and 'usefulness.' J. High. Educ. Policy Manag. 37, 308–319 (2015). https://doi.org/10.1080/1360080X.2015.1034424.
8. Gurung, B., Rutledge, D.: Digital learners and the overlapping of their personal and educational digital engagement. Comput. Educ. 77, 91–100 (2014). https://doi.org/10.1016/j.compedu.2014.04.012.
9. Gallardo-Echenique, E.: An integrative review of literature on learners in the digital era. Stud. Paedagog. 19, 161–184 (2014). https://doi.org/10.5817/SP2014-4-8.
10. Dahlstrom, E., Bichsel, J.: ECAR Study of Undergraduate Students and Information

Technology, 2014 (ECAR Research report). EDUCAUSE Center for Analysis and Research (ECAR), Louisville, CO (2014).
11. Gallardo-Echenique, E.E., Bullen, M., Marqués-Molías, L.: Student communication and study habits of first-year university students in the digital era. Can. J. Learn. Technol. 42, 1–21 (2016). https://doi.org/http://dx.doi.org/10.21432/T2D047.
12. Moghavvemi, S., Sulaiman, A., Jaafar, N.I., Kasem, N.: Social media as a complementary learning tool for teaching and learning: The case of youtube. Int. J. Manag. Educ. 16, 37–42 (2018). https://doi.org/10.1016/j.ijme.2017.12.001.
13. Abney, A.K., Cook, L.A., Fox, A.K., Stevens, J.: Intercollegiate Social Media Education Ecosystem. J. Mark. Educ. (2018). https://doi.org/10.1177/0273475318786026.
14. Nguyen, D.: The university in a world of digital technologies: Tensions and challenges. Australas. Mark. J. 26, 79–82 (2018). https://doi.org/10.1016/j.ausmj.2018.05.012.
15. Casey, S.: 2016 Nielsen social media report. Social studies: A look at the social landscape. The Nielsen Company, New York, NY, US (2017).
16. Kennedy, G.E., Judd, T.S., Churchward, A., Gray, K., Krause, K.-L.: First year students' experiences with technology: Are they really digital natives? Australas. J. Educ. Technol. 24, 108–122 (2008).
17. Bullen, M., Morgan, T., Qayyum, A.: Digital Learners in Higher Education: Looking Beyond Stereotypes. In: Bastiaens, T. and Ebner, M. (eds.) Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2011. pp. 678–687. AACE, Lisbon, Portugal (2011).
18. Morgan, T., Bullen, M.: Crossing boundaries: Exploring social and academic uses of technology in Higher Education. In: Brannon-Hamilton, M., McMinn, S., and Moeini, H. (eds.) International Perspectives on Technology-Enhanced Learning IPTEL 2013 Conference Proceedings. p. 9. The University of British Columbia: Faculty of Education, Vancouver, BC (2013).
19. Bullen, M., Morgan, T.: Digital learners not digital natives. La Cuestión Univ. 60–68 (2011).
20. Xu, S., Yang, H.H., MacLeod, J., Zhu, S.: Social media competence and digital citizenship among college students. Converg. Int. J. Res. into New Media Technol. 135485651775139 (2018). https://doi.org/https://doi.org/10.1177/1354856517751390.
21. Bond, M., Marín, V.I., Dolch, C., Bedenlier, S., Zawacki-Richter, O.: Digital transformation in German higher education: student and teacher perceptions and usage of digital media. Int. J. Educ. Technol. High. Educ. 15, 1–20 (2018). https://doi.org/10.1186/s41239-018-0130-1.
22. Romero, M., Guitert, M., Sangrà, A., Bullen, M.: Do UOC students fit in the Net generation profile? An approach to their habits in ICT use. Int. Rev. Res. Open Distance Learn. 14, 158–181 (2013).
23. Gros, B., Garcia, I., Escofet, A.: Beyond the net generation debate: A comparison between digital learners in face-to-face and virtual universities. Int. Rev. Res. Open Distance Learn. 13, 190–210 (2012).
24. Olofsson, A.D., Lindberg, O.J., Fransson, G.: Students' voices about information and communication technology in upper secondary schools. Int. J. Inf. Learn. Technol. 35, 82–92 (2018). https://doi.org/10.1108/IJILT-09-2017-0088.
25. Rapetti, E., Cantoni, L.: Reconsidering "Gen Y" & Co: From minding the gap to overcoming it [Special issue]. Eur. J. Open, Distance E-Learning – EURODL. 1–13 (2013).
26. Rapetti, E., Picco, A., Vannini, S.: Is mobile learning a resource in higher education? Data evidence from an empirical research in Ticino. 7, 47–57 (2011).
27. Margaryan, A., Littlejohn, A., Vojt, G.: Are digital natives a myth or reality?

University students' use of digital technologies. Comput. Educ. 56, 429–440 (2011). https://doi.org/http://dx.doi.org/10.1016/j.compedu.2010.09.004.
28. Helsper, E.J., Eynon, R.: Digital natives: where is the evidence? Br. Educ. Res. J. 36, 503–520 (2010). https://doi.org/10.1080/01411920902989227.
29. Thompson, P.: Communication technology use and study skills. Act. Learn. High. Educ. 18, 257–270 (2017). https://doi.org/10.1177/1469787417715204.
30. Gallardo-Echenique, E.E., Marqués Molías, L., Bullen, M.: Students in higher education: Social and academic uses of digital technology. Int. J. Educ. Technol. High. Educ. 12, 25–37 (2015). https://doi.org/http://dx.doi.org/10.7238/rusc.v12i1.2078.
31. Calderón, A., Meroño, L., MacPhail, A.: A student-centred digital technology approach: The relationship between intrinsic motivation, learning climate and academic achievement of physical education pre-service teachers. Eur. Phys. Educ. Rev. 1–22 (2019). https://doi.org/10.1177/1356336X19850852.
32. Instituto Nacional de Estadística e Informática (INEI): Perfil Sociodemográfico del Perú. Censos Nacionales 2017: XII de Población, VII de Vivienda y III de Comunidades Indígenas. , Lima, Perú (2018).
33. Instituto Nacional de Estadística e Informática (INEI): Perú: Características de las viviendas particulares y hogares. Acceso a servicios básicos. In: Censos Nacionales 2017: XII de Población, VII de Vivienda y III de Comunidades Indígenas. INEI, Lima, Perú (2017).
34. Guerrero, G., Sugimaru, C., Cussianovich, A., De Fraine, B., Cueto, S.: Education Aspirations among Young People in Peru and their Perceptions of Barriers to Higher Education (Working paper No. 148). Oxford Department of International Development (ODID), University of Oxford, Oxford, UK (2016).
35. Congreso de la República del Perú: Ley Universitaria No. 30220, https://www.sunedu.gob.pe/wp-content/uploads/2017/04/Ley-universitaria-30220.pdf, (2014).
36. British Council: The reform of the peruvian university system: Internationalisation, progress, challenges and opportunities. British Council, Lima, Perú (2016).
37. Instituto Nacional de Estadística e Informática (INEI): Evolución de la pobreza monetaria 2007-2017 (Informe técnico). INEI, Lima, Perú (2018).
38. Creswell, J.W.: Research design: Qualitative, quantitative, and mixed methods approaches. SAGE Publications, Inc., Thousands Oaks, CA (2014).
39. Cohen, L., Manion, L., Morrison, K.: Research methods in education. Routledge, London; New York (2007).
40. Bullen, M., Morgan, T., Belfer, K., Qayyum, A.A.: The digital learner at BCIT and implications for an e-strategy. In: Paper presented at 2008 Research Workshop of the European Distance Education Network (EDEN), Researching and promoting access to education and training: The role of distance education and e-learning in technology-enhanced environments. , Paris (2008).
41. Borsa, J.C., Damásio, B.F., Bandeira, D.R.: Cross-cultural adaptation and validation of psychological instruments: Some considerations. Paid. (Ribeirão Preto). 22, 423–432 (2012).
42. Arafat, S., Chowdhury, H., Qusar, M., Hafez, M.: Cross cultural adaptation and psychometric validation of research instruments: a methodological review. J. Behav. Heal. 5, 129 (2016). https://doi.org/10.5455/jbh.20160615121755.
43. Qayyum, A.: Student help-seeking attitudes and behaviors in a digital era. Int. J. Educ. Technol. High. Educ. 15, 1–16 (2018). https://doi.org/https://doi.org/10.1186/s41239-018-0100-7.
44. Kira, A., Nichols, D.M., Apperley, M.: Human communication in customer-agent-computer interaction: Face-to-face versus over telephone. Comput. Human Behav. 25, 8–20 (2009). https://doi.org/10.1016/j.chb.2008.05.013.

45. Oblinger, D.: Boomers, Gen-Xers, and Millennials: Understanding the “New Students.” Educ. Rev. 38, 36–47 (2003).
46. Gallardo-Echenique, E.E., Marqués-Molías, L., Bullen, M., Strijbos, J.-W.: Let’s talk about digital learners in the digital era. Int. Rev. Res. Open Distrib. Learn. 16, 156–187 (2015). https://doi.org/https://doi.org/10.19173/irrodl.v16i3.2196.
47. Ilomäki, L., Paavola, S., Lakkala, M., Kantosalo, A.: Digital competence – an emergent boundary concept for policy and educational research. Educ. Inf. Technol. 21, 655–679 (2016). https://doi.org/10.1007/s10639-014-9346-4.
48. Hatlevik, O.E., Guomundsdóttir, G.B., Loi, M.: Digital diversity among upper secondary students: A multilevel analysis of the relationship between cultural capital, self-efficacy, strategic use of information and digital competence. Comput. Educ. 81, 345–353 (2015). https://doi.org/10.1016/j.compedu.2014.10.019.
49. Ellanti, P., Moriarty, A., Coughlan, F., McCarthy, T.: The use of WhatsApp smartphone messaging improves communication efficiency within an Orthopaedic Surgery Team. Cureus. 9, 1–5 (2017). https://doi.org/10.7759/cureus.1040.
50. Howe, N., Strauss, W.: Millennials Rising: The Next Great Generation. Vintage Original, New York, NY, USA (2000).
51. Martin, C.A., Tulgan, B.: Managing the Generation Mix: From Urgency to Opportunity. HRD Press, Amherst, MA (2006).