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Perceptions and experiences of students on the use of interactive online learning technologies in Mauritius

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ABSTRACT

With the advent of e-learning, advocates use the term interactivity instead of interaction among students, and between the teacher and the students. Many universities use Moodle for online teaching and learning. This paper explores the perceptions and experiences of students in three Higher Education Institutions (HEIs) in Mauritius. A mixed-methods approach was used, with an online survey questionnaire administered to 600 students and focus group discussions were conducted with 15 students from these institutions. It was found that 68.4% of respondents used WhatsApp compared to only 23.6% of them who used the e-learning platform, Moodle. There were no associations between the use or frequency of using WhatsApp or Facebook and the types of HEI to which the students belonged. Students preferred WhatsApp due to its facility for knowledge sharing and construction, its interactivity, its usability, respect for privacy and instant communication. From the findings, it is recommended that HEIs bring a shift in their approaches to teaching and learning from cognitivism to socio-constructivism, connectivism and heutagogy.

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1. INTRODUCTION

There is a growing demand for and acceptance of hybrid modes of learning for undergraduate and graduate students. According to the Pew Research Center, it was found that 89% of four-year colleges and universities use fully online, hybrid/blended online or other forms of distance instruction to their students [1]. Moreover, 32% of students enrolled in higher education in 2013 opted for at least one online course [2]. The main reasons for higher education institutions (HEIs) to offer online courses are the demand for flexibility, providing access to students who would otherwise be unable to, increasing the number of available courses and improving students' enrolments [3].

Hybrid modes of learning, including the use of e-learning platforms and social media networks, provide innovative ways for students to enhance their learning experiences. Rather than being an extensive tool for social communication, social media provides students with learning activities. The advent of web 2.0 contributed massively to integrating social media into the entire learning ecosystem [4]. In contrast, most HEIs are still using traditional learning management systems (LMS). However, the integration of social media in educational systems promotes students' participation through collaborative learning and engagement [5].

The term 'social media' is considered as a variety of networking tools that enhance the social aspect of the internet and can interchangeably be cited as Web 2.0 or social software [5]. Several studies have revealed that these social networking tools help to engage students in learning activities by encouraging collaboration, active participation, interaction, critical thinking and sharing of information [6-9]. Social media is an extremely influential tool for learning, knowledge and value creation [10]. Increased awareness of social media encourages disengaged students to collaborate with their peers and tutors for improved learning experiences [11]. One example is the use of Facebook, whereby academicians use this communication media for information exchanges with their students [12]. There has been a rapid growth in the use of social media during the year 2007 to 2010 [13] and this trend is maintained up to now [4].

Most HEIs have been using LMS as a means for their students to have access to their courses' content in various formats such as text, audio, and video [14]. The LMS is an electronic platform whereby students and teachers interact through chats, forums, message boards, and video-conferencing. According to Piotrowski [15], the e-learning platform provides integrated support such as creation, organization, delivery, communication, collaboration, and assessment of materials. An e-learning platform that has gained popularity in recent years both in Mauritius and elsewhere is Moodle. Public HEIs in Mauritius have been using the e-learning platform Moodle for years now. It is open-source software, is used all over the world by independent teachers, schools, universities, and companies and is highly credible [16-19]. Three thousand three hundred and twenty-four web sites from 175 countries have registered with it and have 75 languages [20]. Despite the various advantages of using e-learning platforms such as both synchronous and asynchronous communication [15, 21, 22], their adoption still poses a challenge to many educational institutions, namely a lack of simple-to-obtain support, lack of technological skills by students and teachers to use it unless there is an administrator and the user data is stored into a cache [23].

This paper investigates the perceptions and experiences of Mauritian students in the use of Moodle vis a vis social media networking site. Mauritius being a cyber-island, with diverse ethnic populations, has its educational system from kindergarten to secondary schooling focused on traditional classroom-based learning. This research is unique to Mauritius as it is only in recent years that hybrid modes of learning have emerged as useful tools to promote student learning and engagement. Institutions have been using Moodle as a means of communication with their students as they envisaged increasing their enrolment and running part of the courses in hybrid mode.

However, according to the Statistics Mauritius report in 2016, it was established that 39.1 % of smartphone users, are above 12 years and 70.7% are less than 30 years of age [24]. Smartphones are used for instant messaging (80.7%); visiting social networking sites (79.3%) and general internet browsing (75.9%). It is only in recent years that Moodle was adopted in the tertiary educational systems. There is limited data on whether students actively use Moodle and how they perceive Moodle in comparison to other types of informal learning modes such as social media networks.

Whatsapp seems to be more popular than the Moodle platform among young individuals because it has better features. Given the popularity of social media networks, there is a critical need for HEIs in Mauritius to change their mode of delivery and teaching strategy that would match students' readiness to use them and learn more effectively. Thus, HEIs must follow the pedagogical trends of those in the industrialised world and dedicate their time and efforts to adopt social media networks as a medium or a tool of effective teaching and learning. M-learning is an innovative online learning approach among young adult students who are millennials and technology savvy. It is obvious that it has become imperative for HEIs to make an urgent shift in their pedagogical and andragogical philosophy so that learning turns out to be the most enriching experience for the students. M-learning, as a tool, allows university learners to use social media networks instantly, on the go, wherever they are. So, learning by using WhatsApp may become a seamless experience, compared to the Moodle platform, which is less pedagogically efficient. Hence, this paper examines the frequency of usage of social media networks (Facebook, Twitter, Instagram, WhatsApp, and others) by undergraduate and graduate students in Mauritius, and explores how undergraduate and graduate students perceive Moodle versus social media networks for their learning purposes.

2. RESEARCH METHOD

This section provides a description of the processes and approaches used by the researchers. It also explains the criteria for the selection of respondents as well as the tools that were used for data collection and analysis. A mixed-method approach comprising of both qualitative and quantitative methods of data collection and analysis was used by the researchers. Online survey questionnaires were administered to 600 students from three public HEIs offering courses in blended mode. The frequency of use of social media networks and the e-learning platform Moodle were surveyed. There were 433 students responded to the study

(~72.2%), a response rate that was considered as being representative to the opinion of the student community.

Based on the quantitative observation, the researchers explored the 'why' behind these findings through focus group interviews with students from the three public HEIs. The participants were students from three HEIs namely the University of Mauritius (UoM) (a conventional university), the Open University of Mauritius (OU) (a blended university) and the Centre for Open and Distance Learning of the Mauritius Institute of Education (MIE) (a purely online centre). To give meaning to quantitative findings, the researchers conducted two focus group interviews with students of each institution. Due to the nature of the study, participants were selected through a purposive sampling technique which is 'a nonprobability technique of establishing a sample space for a given study' [25]. Consequently, the respondents were selected based on their unique qualities, namely that they were all using a blended mode of learning—traditional face to face lectures and online tutorials, they were all mature graduate and postgraduate students and, thus, they were likely to provide their opinions and experiences on the use of Moodle and social media networks in their learning. The focus group discussions allowed for a rich exploration of views and perceptions of students using the Moodle platform for e-learning. The answers emanating from the interviews were centered on the factors that ease their use of the application of their choice. The questions that were asked to the participants were: 1) Why do you have a preference for WhatsApp as compared to other social media networks? 2) Why are you making less use of the e-learning platform Moodle for interaction with peers and tutors? 3) What can explain your interest for using WhatsApp as compared to Moodle as a means of interaction?

Prior to analysis, the data were cleaned for completeness and clarity, and were coded. Thematic content analysis was used to analyse the qualitative data. The dataset was analysed quantitatively using the statistical analysis software SPSS. Chi-square tests were performed to determine associations between the use of Moodle and types of institutions. Descriptive statistics were used to describe the use of social media, Moodle and sociodemographic characteristics.

3. RESULTS AND DISCUSSION

3.1. Sociodemographic characteristics

The sample considered for the research consisted of a total of 433 participants, out of which 28.6% were male and 71.4% were female. The participants were students studying in the blended mode of learning from three public HEIs. The majority of the respondents were between the age of 18-25 years (46.7%) followed by 26-35 years (24.7%), 35-50 years (24.2%) and above 50 years (4.4%) respectively.

In Mauritius, the student population studying in the blended mode of learning is predominantly female [26]. This is accountable to the flexibility that blended mode of learning offers and that female students can cope with their work as well as their family obligations [27]. Also, female students were less likely to get engaged in STEM as compared to their male counterparts [28]. The respondents were mostly at the undergraduate level of education (72.7%), followed by graduate-level (25.6%) and doctoral level (1.7%). They were from both urban and rural regions. There was a fairly uniform distribution of the students in rural (51.8%) and urban regions (48.2%). The majority of respondents were undergraduates as at that level, the student population is higher due to high institutional intake and due to the offering of several undergraduate courses [26].

3.2. Social media use

The participants were asked which types of social networking sites they used for learning purposes. It was found that the majority of the respondents have a preference for WhatsApp (68.4%) followed by Facebook (52.6%), Instagram (16.1%), others (14.3%), none (13.9%) and Twitter (2.9%). The other social media networks include Snapchat, Q-zone, WeChat, and Google+. From the findings, it is observed that the students, who were using social media for their learning, have a preference for WhatsApp and Facebook for their social interaction. The majority of the students were using social media at least thrice weekly (57%), once weekly (38%), once monthly (3%), once in a semester (2%).

3.3. Use of Moodle

It was observed that 23.6% of the students used Moodle at least thrice weekly (very often), 42.6% of them at least once weekly (often), 20.3% of them at least once a month (rarely), 4.6 % of them at least once a semester and 9% did not make use of it at all. It was found that there was no statistically significant association between the use of Moodle and (i) the gender of the respondents ($p > 0.05$), (ii) the institutions they belong to ($p > 0.05$), (iii) the level of study ($p > 0.05$), and (iv) region where the respondents live ($p > 0.05$). No association was also noted with the frequency of use of WhatsApp and the frequency of use of Moodle ($p > 0.05$). Figure 1 shows the frequency of use of Moodle.

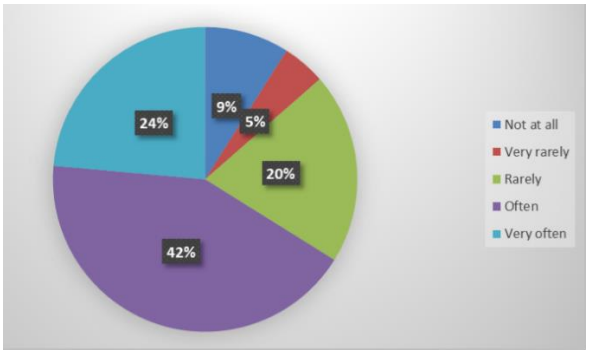

Figure 1. Frequency of use of Moodle

3.4. Perceptions and experiences toward social media and moodle

The focus group discussions revealed that the students were keen to use WhatsApp or Facebook in contradiction to Moodle as social media is more users friendly and convenient and it is easily accessible on smartphones. The students wanted to have their identity group of students with whom they could communicate to and share their work with. WhatsApp allowed them to create their closed groups with whom they were free to interact and have a more focus means of communication.

Participants mentioned that WhatsApp is a very light software in terms of occupied memory as compared to Moodle whereby downloading requires higher internet capacity and is time-consuming. The social media apps had recording facilities and allowed the sharing of files and instant notification. Students perceived social media networks as very private means of communication. They could invite their peers for social interaction and even hide their posts from their tutors or peers with whom they were shy or did not want to share their work. All these features were not available on Moodle for the students. Students perceived Moodle as a formal means of communication whereby everyone from the course could have access to their posts and was restricted to only those students on the same programme of study. It did not allow for diversification in knowledge creation. Students found that WhatsApp was very handy and could be used from a smartphone. WhatsApp allowed the users to be in constant communication at any time and any place through their smartphone, provided with internet coverage.

Findings from the qualitative data provided details regarding the perceptions of students about their use of interactive online learning technologies in Mauritius, irrespective of whether they were studying in a blended mode institution, purely online institution or a conventional brick and mortar institution. The features that they were looking for to use more frequently in their learning were the sharing of ideas, greater usability, respect for privacy, interactivity and instant communication. WhatsApp provided them with such features, more than Moodle.

a. Sharing of ideas

E-learning is based on socio-constructivism, whereby students are able to generate the content of their learning and knowledge through collaborative online learning through the online platform. Indeed, the basis of e-learning from the social constructivist learning theory is knowledge sharing, not knowledge receiving; thinking and analysing, not accumulating or memorising; understanding and applying, not repeating back knowledge; and being active, not passive [29]. Participant B of FG1 justified the possibility of using WhatsApp for knowledge construction, by stating:

"We can share notes, presentations, discuss everything, by making groups on WhatsApp."

This finding is consistent with the digital Blooms' Pyramid, which illustrates that students can share ideas and knowledge through remembering, understanding, applying, analysing, evaluation and creating. All these are achieved through the use of social networking, blog journaling, subscribing, editing, creating mashups, uploading and sharing of online resources, and leveraging of Google docs [30].

b. Greater usability

Usability is defined as the effectiveness, efficiency and satisfaction with which the student achieves specific goals in the online learning environment [31]. In this current study, it was found that students in Mauritius could easily use WhatsApp to record lectures and send them to their classmates who could not attend on-campus tutorials. Participant E pointed out that they could do everything by using WhatsApp:

"In terms of recording, we can record and then send it to the group. As compared to Moodle, WhatsApp is handier. Everything can be done on the smartphone."

However, there is a trade-off between usability and security or privacy [32]. This issue was not revealed in the study in Mauritius.

c. Respect for privacy

This study revealed that the students perceived that their privacy was more protected when they used WhatsApp compared to Moodle. Participant B of FG2 averred:

"*WhatsApp is a more formal way as we just need the phone number of the person and we don't need to knowhis personal and private life and the group is created and the message is sent to the group."*

However, many studies have found that using WhatsApp is not that secured for the user as well as the sender. Though messages, videos, phone calls, and audios cannot be encrypted by another person, yet simply encrypting the end-to-end channel of WhatsApp does not guaranty the security and privacy of both the user and the sender [33]. All depend on the security fundamentals such as the end-to-end encryption (E2EE), signal protocol, plausible deniability, and the forward-secrecy. The links to WhatsApp chats are easily available and accessible on other search engines, allowing information about the people in the WhatsApp chats and when they were logged in [34]. So, it is obvious that the students' perceptions about the respect for their privacy were only a perception that they did not consider in terms of technicality.

d. Interactivity

This study showed that students were very active in exchanging information, ideas and learning content among themselves through WhatsApp than through Moodle. They used it for chatting among classmates and with the lecturers to discuss the subject content. There was a high level of interactivity. Participant A of FG1 unhesitatingly reported:

"You can do group chat and interact with peers..."

Indeed, the students do interact for hours on WhatsApp. However, they also use it for social interactions and communication, extra-curricular activities, wishes and congratulations, and entertainment purposes also [35]. So, the interactions are related to both academic and non-academic purposes [36].

e. Instant communication

The main reason for using WhatsApp was undoubtedly for communication purposes. In this study, it was found that students preferred using WhatsApp than Moodle as it provided them with instant communication. Among all the instant messengers, WhatsApp is the most popular [37]. For the students of this study, it allowed them to communicate most conveniently. Participant D of FG1 pointed out:

"*It is not motivating to go and check lecture notes on Moodle as it requires bigger downloading facilities and is time-consuming to load. There is also a distraction everywhere. We have to go through long procedures before getting our lecture notes for instance. We need to search for the module, to browse through it whereas with WhatsApp we have instant communication and is very interactive."*

So, students perceived numerous advantages of instant communication when using WhatsApp, which overweighed those of using Moodle, viewed as less interactive by them. However, instant communication and the hours spent on WhatsApp may become miscommunication [38]. It has negative effects on interpersonal relationships and communications between students and lecturers and among students, and this may have an adverse impact on effective learning, through real group work, role play and other authentic teaching and learning approaches [39]. Yet, a recent study found that the learning outcomes achieved by students were not different for online/blended learning as compared to on-campus lectures in universities [40].

4. CONCLUSION

The study revealed that Mauritian students in HEIs were keen to use WhatsApp due to its augmented features as compared to Moodle. They considered Moodle as a formal platform whereby there was no privacy while communicating. They wanted to identify their own peers with whom to interact. They preferred platforms that were restricted to students of their choice so that they could express themselves, especially for shy students. Social media was easily available on their smartphones and they could easily connect social media apps to internet facilities. Downloading and uploading of files did not require high internet capacity on social media apps. This study calls upon the institutions to revisit the logging and accessibility criteria of the e-learning platform so that it meets the requirements and expectations of the students.

Based on the findings of this study, numerous recommendations are made. Higher Education Institutions should adapt their e-learning platform to students' technological needs and interests. The e-learning platform should be less of a depository type of environment and more of an interactive and user-friendly one, and where students are free to engage in their learning without fear of their privacy being violated. Moreover, e-learning tools must promote the social construction of knowledge whereby students may share their ideas. There should be a shift in the teaching and learning approaches with respect to e-learning. The shift should be from cognitivism to social constructivism, connectivism, and heutagogy. This, indeed, explains the trends of some pioneer open universities in adopting the use of social media for e-learning, e-feedback, and e-assessment, which are more in line with the easy-to-use technology to learn in the context of digitalised education. This would reduce the mismatch between institutional approaches to teaching and students' needs and engagement for learning through more suitable interactive online learning technologies.

REFERENCES

[1] K. Parker, A. Lenhart, and K. Moore, *The digital revolution and higher education: College presidents, public differ on the value of online learning*. Washington D.C: Pew Research Center, 2011.

[2] I.E. Allen and J. Seaman, *Changing course: Ten years of tracing online education in the United States*. San Francisco, CA: Babson Survey Research Group and Quahog Research Group LLC, 2013.

[3] B. Parsad, L. Lewis, and P. Tice, *Distance education at degree-granting postsecondary institutions: 2006-2007*. Washington D.C.: National Center for Education Statistics Institute of Education Sciences, 2008.

[4] W. Al-Rahmi, M. Othman, and L. Yusof, "The role of social media for collaborative learning to improve the academic performance of students and researchers in Malaysian higher education," *The International Review of Research in Open and Distributed Learning*, vol. 16, no. 4, pp. 1-17, 2015.

[5] N. Dabbagh and A. Kitsantas, "Personal learning environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning," *The Internet and Higher Education*, vol. 15, no. 1, pp. 3-8, 2012.

[6] H. Ajjan and R. Hartshorne, "Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests," *The Internet and Higher Education*, vol. 11, no. 2, pp. 71-80, 2008.

[7] R. Mason, "Learning technologies for adult continuing education," *Studies in Continuing Education*, vol. 28, no. 2, pp. 121-133, 2006.

[8] S. G. Mazman and Y. K. Usluel, "Modelling educational usage of Facebook," *Computers & Education*, vol. 55, no. 2, pp. 444-453, 2010.

[9] N. Selwyn, "Looking beyond learning: Notes towards the critical study of educational technology," *Journal of Computer Assisted Learning*, vol. 26, no. 1, pp. 65-73, 2010.

[10] G. D. Kuh, T. M. Cruce, R. Shoup, J. Kinzie, and R. M. Gonyea, *Connecting the dots: Multi-faceted analyses of the relationship between student engagement results from the NSSE, and the institutional practices and conditions that foster student success*. Indiana University Center for Postsecondary Research, 2007.

[11] C. Rutherford, "Using Online Social Media to Support Preservice Student Engagement," *MERLOT Journal of Online Learning and Teaching*, vol. 6, no. 4, pp. 703-711, 2010.

[12] D. Mack, A. Behler, B. Roberts, and E. Rimland. "Reaching students with Facebook: Data and best practices," *Electronic Journal of Academic and Special Librarianship*, vol. 8, no. 2, pp. 1-4, 2007.

[13] S. D. Smith and J.B. Caruso, "The ECAR study of undergraduate students and information technology," *EDUCA USE Center for Applied Research (ECAR)*, 2010.

[14] J. S. Mtebe and R. Raisamo, "Challenges and Instructors' intention to adopt and use open educational resources in Higher Education in Tanzania," *The International Review of Research in Open and Distance Learning*, vol. 15, no. 1, pp. 249-271, 2014.

[15] M. Piotrowski, *What is an e-learning platform in Learning management system technologies and software solutions for online teaching: tools and applications*. I. Global, Editor, 2010.

[16] C. D. Santo, F. Colace, and M. Vento, "Evaluating Online Learning Platforms: A Case Study," *36th Hawaii International Conference on System Sciences, Proceedings of the IEEE*, 2003.

[17] M. Paulsen, "Experiences with Learning Management Systems in 113 European Institutions," *Journal of Educational Technology & Society*, vol. 6, no. 4, pp. 134-148, 2003.

[18] B. Alexander, "Web 2.0: A new wave of innovation for teaching and learning?" *Educause Review*, vol. 41, no. 2, pp. 32-44, 2006.
[19] C. Costa, H. Alvelos, L. Teixeira, "The Use of Moodle e-learning platform: A study in a Portuguese university," *Procedia Technology*, vol. 5, pp. 334-434, 2012.
[20] S. Kumar and K. Dutta, "Investigation on security in LMS Moodle," *International Journal of Information Technology Management*, vol. 4, no. 1, pp. 233-238, 2011.
[21] S. S. Mahmoud, "A Proposed Model for Distributing e-Courses Content through Mobile Technology Architectures in word academy of science, engineering and technology," *International Journal of Humanities and Social Science*, vol. 2, no. 1, pp. 39-54, 2008.
[22] P. Mellow, "The media generation: Maximise learning by getting mobile," pp. 469-476, 2005. [Online]. Available: https://www.ascilite.org/conferences/brisbane05/blogs/proceedings/53_Mellow.pdf
[23] A. Chavan and S. Pavri, "Open-source learning management with Moodle," *Linux Journal*, vol. 2004, no. 128, 2004.
[24] Ministry of Finance and Economic Development, *Statistics Mauritius 2016*, Port Louis: Ministry of Finance and Economic Development, 2017.
[25] H. F. Weissberg, J. A. Krosnick, and B. D. Bowen, *An introduction to survey research and data analysis*. Glenview, IL: Scott Foresman, 1989.
[26] Tertiary Education Commission, "Participation in tertiary education 2018," 2019. [Online]. Available: http://www.tec.mu/pdf_downloads/Participation_Tertiary_Education_2018.pdf
[27] L. Medina, "Blended learning: Deficits and prospects in higher education," *Australasian Journal of Educational Technology*, vol. 34, no. 1, pp. 42-56, 2018.
[28] K. Roberts, "Engaging more women and girls in mathematics and STEM fields: The international evidence," Report prepared for the Australian Mathematical Sciences Institute, 2014.
[29] B. A. Marlowe and M. L. Page, *Creating and sustaining the constructivist classroom*, (Second Edition). California: Corwin Press, 2005.
[30] H. Haya, "Blending technology with constructivism: Implications of ELT classroom," *The Journal of Teaching English with Technology*, vol. 15, no. 1, pp. 3-13, 2015.
[31] S. Caro-Alvaro, E. Garcia-Lopez, A. Garcia-Cabot, L. de Marcos, and C. Hervaiz, "Identifying Usability Issues in Instant Messaging Apps on iOS and Android Platforms," *Mobile Information Systems*, vol. 2018, no. 1, pp. 1-19, 2018.
[32] N. Kumar and S. Sharma, "Survey analysis on the usage and impact of WhatsApp messenger," *Global Journal of Enterprise Information System*, vol. 8, no. 3, pp. 51-57, 2016.
[33] N. Rastogi and J. Hendler, "WhatsApp security and the role of metadata in preserving privacy," pp. 269-275, 2017. [Online]. Available: https://www.researchgate.net/publication/312778290_WhatsApp_security_and_role_of_metadata_in_preserving_privacy
[34] K. O' Floherty, "WhatsApp security: Is this hidden flaw a new reason to quit," 2020. [Online]. Available: https://www.forbes.com/sites/kateoflahertyuk/2020/02/29/whatsapp-security-is-this-hidden-flaw-a-new-reason-to-leave/#76d365035b90
[35] B. Diganta and S. Saurabh, "WhatsApp groups in an academic context: Exploring the academic uses of WhatsApp groups among the students," *Contemporary Educational Technology*, vol. 11, no.1, pp. 31-46, 2020.
[36] K. Mohamed and E. Sumitha, "Perceptions and use of social networking sites by the students of Calicut University," *DESIDOC Journal of Library and Information Technology*, vol. 31, no. 4, pp. 295-301, 2011
[37] T. Sutikno, L. Handayani, D. Stiawan, M. Riyadi, and I. Subroto, "WhatsApp, Viber and Telegram: Which is the best for instant messenger?" *International Journal of Electronic and Computer Engineering*, vol. 6, no. 3, pp. 909-914, 2016.
[38] T. Chan, W. Young, and A. Harmizi, "Usage of WhatsApp and interpersonal communication skills among private university students," *Journal of Arts and Social Sciences*, vol. 3, no. 2, pp.15-25, 2020.
[39] V. Gjylbegaj and O. Jararaa, "The effects of social media on youth's interpersonal communication in UAE," *International E-learning of Advances in Social Sciences*, vol. 4, no. 10, pp. 23-29, 2018.
[40] I. Chirikov, T. Semenova, N. Maloshonok, E. Bettinger, and R. Kizilcec, "Online education platforms scale college STEM instruction with equivalent learning outcomes at a lower cost," *Science Advances*, vol. 6, no. 15, pp. 1-10, 2020.