

'Technology saves us?' Malaysian lecturers' beliefs and readiness towards the application of technology-assisted student-centered learning

Siti Amaliya Mohd Radyi^{1*}  <https://orcid.org/0000-0002-7918-6703>

Azri Bin Usman²  <https://orcid.org/0000-0001-7059-9598>

¹Faculty of Entrepreneurship and Business, Kuala Lumpur Metropolitan University College, Malaysia

²School of Arts, Science and Technology, Perdana University, Malaysia

ABSTRACT

Although studies on technology-assisted student-centered learning (henceforth TA-SCL) is enormously growing in the recent years, few researchers concern on the current state of lecturers' beliefs and readiness to implement TA-SCL. This study aims to explore Malaysian lecturers' attitude in terms of beliefs and readiness to carry out TA-SCL approach in university context. A survey design under the procedure of quantitative research was applied to reach the objective. This study involved 207 lecturers teaching at some universities in Kuala Lumpur Malaysia who were selected using purposive sampling technique. The data were collected using a four-point Likert scale online questionnaire, and further analyzed in the forms of descriptive statistics using SPSS program. The results demonstrated that Malaysian lecturers hold a high level of beliefs about the application of TA-SCL in their universities. The finding further revealed that they possessed significant degree of readiness to implement TA-SCL in their teaching activities. These findings leave some implications for the integration of technology for educational purpose, particularly to enhance the efficacy of student-centered learning. This study portrays clear picture of Malaysian lecturers' current beliefs and readiness towards the TA-SCL, as well as offers fruitful insights for educational stakeholders in Malaysia to begin acknowledge this approach in university learning activities.

This is an open access article under [CC-BY-NC 4.0](https://creativecommons.org/licenses/by-nc/4.0/) license.



ARTICLE INFO

Keywords:

lecturers' beliefs and readiness; Malaysian lecturers; technology-assisted student-centered learning

Article History:

Received: 03 November 2022

Revised: 17 December 2022

Accepted: 18 December 2022

Published: 18 December 2022


How to Cite in APA Style:

Radyi, S. A. M. & Usman, A. B. (2022). 'Technology saves us?' Malaysian lecturers' beliefs and readiness towards the application of technology-assisted student-centered learning. *Journal of Educational Management and Instruction*, 2(2), 101-111.

Introduction

In the recent years, the use of technology has gained increasing attention as a platform for bridging formal and informal settings into a more interesting and attractive learning activities. Technology-assisted learning enables learners to actively and effectively use digital-based platforms both in-class and out-of-class activities (Bahari, 2021; Shadieff & Dang, 2022; Zhang & Zou, 2022). There has been an increasing number of studies exploring the use of technology for educational purposes both in a formal classroom activity and informal outside the classroom (Ahmed & Upoku, 2022; Degner et al., 2021; Mehrvarz et al., 2021; Muñoz et al., 2022; Temban et al., 2021; Yeung & Yau, 2022). These studies have generally concerned on the effectiveness and suitability of

* Corresponding author: Siti Amaliya Mohd Radyi  samaliya.mradyi@klmuc.edu.my

 <https://doi.org/10.22515/jemin.v2i2.5960>

technological devices for learning in higher education, the use of digital devices in inside and outside classroom settings, and students' perceptions on the efficacy of digital learning activities. Particularly amidst the COVID-19 pandemic in the recent years, research exploring the practical use of technology has received increasing recognition to assist online learning activities (Tsao et al., 2021; Wahyuningsih & Baidi, 2021; Yates et al., 2021).

In Malaysia, the integration of technology in education, particularly in university level, has gained attention for years. Studies depict that Malaysian universities show great efforts to develop digital learning environment (Bujang et al., 2020; Samsudin, 2021). During the COVID-19 pandemic, online learning using technology was becoming crucial key to continue the sustainability of education (Izhar et al., 2021). At the time of COVID-19 pandemic recovery like today (in the middle of 2022, at least when this study was being conducted), education system is going to normal, where students and teachers back to universities to follow in-class learning activity. However, online learning mode, which has been conducted during the COVID-19 pandemic in almost two years, offers some opportunities, one of which is fostering student-centered learning (Abdigapbarova & Zhiyenbayeva, 2022; Dunbar & Yadav, 2022). Student-centered learning is promoted according to constructivist view of learning, in which the process of learning requires students to construct their own knowledge with new materials and information, manage their ways of learning, and evaluate their learning progress (Hannafin et al., 2014; Lee & Hannafin, 2016). It plays crucial role to achieve the success of education, and studies have demonstrated that students' independency in learning is becoming a primary factor of successful learning process (Andersen & Andersen, 2017; Asoodeh et al., 2012; Capone, 2022). One of the ways to foster student-centered learning is using digital technology as an aid to grab students' interests as well as to create more interactive learning activities. Hence, technology-assisted student-centered learning is worthy to explore to enhance the efficacy of students' autonomous learning.

Technology-assisted student-centered learning (TA-SCL) is defined as the use of technology to enhance students' autonomous in learning (Rollakanti et al., 2020). According to previous studies, use of technology has been proven to contribute to student-centered learning development. Studies show that blended learning, combination of in-class and out-of-class learning using digital platforms, has considerable benefits for the enhancement of student-centered learning in terms of promoting students' motivation (Capone, 2022), academic performance (Ceylan & Kesici, 2017; Qutieshat & Abusamak, 2020), and satisfaction (Prifti, 2022). Hight et al. (2021) demonstrated that social media videos could facilitate student-centered learning and public engagement through project-based learning activity. Similarly, Sarvary et al. (2022) found that online learning through technological devices and in-person courses provide opportunities for improving student-centered Biology laboratory instruction. Moreover, Turdieva and Olimov (2021) and Wang and Song (2022) disclosed that games technology is an innovative type of student-centered learning, and provided significant contribution in developing students' autonomous learning. From these previous studies we are well informed that technology possesses crucial role in fostering student-centered learning in various contexts of education.

Studies have also revealed the teachers' and students' views on student-centered learning approach. Chen and Tsai (2021) revealed in-service teachers' conceptions of mobile technology-integrated instruction to develop student-centered learning. The result provides educators and teachers with deep comprehension of advanced technology-enhanced learning for designing student-centered learning activities. In a similar direction, Osman et al. (2015) and Sabah and Du (2018) found positive perception of higher education teachers on the practices of student-centered learning in a digital learning environment, despite of several challenges encountered such as lack of curriculum contents and high cost of assessment. From students' point of views, Benlahcene et al. (2020) and Houry (2022) portrayed that university students hold

positive viewpoints about technology-enhanced student-centered learning. Finding of [Katawazai \(2021\)](#) further emphasizes that outcome-based education and student-centered learning are crucial for achieving educational purposes in today's era of twenty-first century learning. In short, previous studies have yielded on a consensus that student-centered learning is a must-approach used in today's digital era of education. Hence, technology-assisted student-centered learning is a promising alternative for the success of future education in university level.

Although research on technology-assisted student-centered learning is growing enormously in the recent years, portraying lecturers' beliefs and readiness for such an approach in Malaysian university context still remains unexplored. Few researchers on this area have addressed the current state of lecturers' beliefs along with their readiness to implement student-centered learning with the assistance of technology. Previous works have merely focused on the impact of technology usage on the development of student-centered learning and teachers'/students' perception on its implementation. This study is urgent in two ways. First, lack of attempt was directed to reveal lecturers' beliefs and readiness to implement this approach in Malaysian context. Second, in teaching-learning context, examining instructors' beliefs and readiness toward particular learning approach that will be implemented is urgently required to ensure the efficacy of educational process.

Drawing on this gap, the present study takes a new look at lecturers' beliefs and readiness toward the implementation of technology-assisted student-centered learning in Malaysian university context. The need for this study is that as the educational system is recently changing from traditional face-to-face learning in a formal classroom to hybrid learning by integrating technology into education system, so Malaysian education stakeholders (policymakers, curriculum developers, educators, students, and staffs) should begin to acknowledge the crucial role of digital technologies to foster student-centered learning. Understanding lecturers' beliefs and readiness will help the successful application of technology-assisted student-centered learning, where lecturers play crucial roles in teaching-learning activity. The current study is specifically looking to find out empirical answers for the following research questions: (1) what are the beliefs of Malaysian lecturers towards technology-assisted student-centered learning? and (2) to what extent are Malaysian lecturers ready to implement technology-assisted student-centered learning?

Method

Research Design and Study Area

This study aims to depict Malaysian lecturers' beliefs and readiness to implement technology-assisted student-centered learning in university level. A survey design under the procedure of quantitative approach was adopted. The reason of using this method is to portray general beliefs and readiness of Malaysian lecturers to carry out teaching activities with technology integration to foster students' autonomous learning. The locus of this study was in Kuala Lumpur, one of the largest cities in Malaysia. Malaysian universities show great efforts to create digital environment for academic purposes in campus. According to the preliminary observation done by the authors, most of Malaysian universities were beginning to implement combined learning modes (online and offline) as the COVID-19 pandemic was recovering. Hence, it is crucial to portray the lecturers' beliefs and readiness related to using technology for developing student-centered learning in such a hybrid learning mode.

Participants

The participants of the survey were lecturers' teaching at some universities in Kuala Lumpur Malaysia. They were purposively selected to join the survey by filling out the questionnaire. As long as their profession is lecturer, and has been teaching at university

for some years, they were welcome to participate as respondents in this study. However, the primary requirement for being participant in this study is they must have been teaching in a hybrid learning mode using technological devices. This requirement was stated in the first section of the online questionnaire to ensure that it is fully fulfilled. At last, a total of 207 lecturers participated in this study by filling out the questionnaire. According to [Fugard and Potts \(2015\)](#), this number of respondents is manageable for quantitative research to seek the answers of this study's research questions. Their detailed demographic data information is presented in [Table 1](#).

Instrumentation and Data Collection

To collect the data from the participants, this study used an eclectic questionnaire which is an easy-to-use tool for gathering numerical data through a survey ([Creswell, 2014](#)). The items of questionnaire were obtained and adapted from [Katawazai \(2021\)](#) about teachers' beliefs and readiness on student-centered learning. The authors made some adaptation in terms of integrating the use of technology in respondents' beliefs and readiness. The first part consists of respondents' demographic information such as age, gender, teaching experience, and education degree. This part also comprised the primary requirement for participating in this study such as participants' limitation in Kuala Lumpur city and having experience of teaching in a hybrid learning mode. The second part included items exploring the respondents' beliefs (5 items) and readiness (4 items) about technology-assisted student-centered learning (see [Table 2](#)). All items were measured using four-point likert scale ranging from strongly agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). In the present study, reliability and validity of the items were checked in terms of Cronbach's Alpha level, and the value of the items is (.923) coefficient. This means that the consistency of questionnaire items is high and reliable. Before administration, the questionnaire was tried out to ensure the practicality and readability. It was further spread in the forms of link to the targeted participants through emails, WhatsApp and Facebook, the most frequently used social media in Malaysia. From January to July 2022, 226 data were obtained, however, only 207 responses were used for this study, while the other 19 responses were incomplete.

Data Analysis

The data were further analyzed using SPSS program for descriptive statistics in the forms of frequency, percentage, and tabulation. First, the data related to demographic information of the participants were analyzed in terms of frequency and percentage (see [Table 1](#)). Second, the data about lecturers' beliefs and readiness in practicing technology-based student-centered approach were examined, also in terms of frequency and percentage of each item (see [Table 2](#)). The percentage of the total item shows to what extent the lecturers possess the degree of beliefs and readiness to implement student-centered learning using technology integration in their teaching activities.

Results

Participants' Demographic Information

As presented in [Table 1](#), most of the participants (more than half) are in the age of 31-35 years (59.2%), followed by 36-40 years old of age (20.2%), 24-30 years of age (13.1%), and 40 years of age (7.5%), respectively. The highest number of the participants joining this study is at the age of 31-35, while the lowest number is at the age of above 40. This indicates that most of them are categorized as young lecturers, and just a small number of them are senior lecturers at above 40 years of age. Hence, their age is relevant to other demographic data such as teaching experience and degree of education. As they are young lecturers, most of the participants (47.5%) have teaching experience at universities for 6-10 years, while only 7.5% of them possess above 15 years of teaching experiences. In terms of education, the participants are dominated by lecturers whose

education degree is Master (76%), while only 22.7% of them hold Ph.D degree and 0.9% still graduated from bachelor degree. With regards to gender, the number of female participants (53.7%) is higher than male participants (46.3%).

Table 1. Participants' Demographic Information

	Frequency	Percentage %
Age		
24-30 years	27	13.1
31-35 years	123	59.2
36-40 years	42	20.2
>40 years	16	7.5
Total	207	100
Gender		
Male	96	46.3
Female	111	53.7
Total	207	
Teaching Experience		
1-5 years	47	22.8
6-10 years	98	47.5
11-15 years	46	22.3
>15 years	16	7.5
Total	207	100
Education		
Bachelor	2	0.9
Master	158	76.4
Ph.D	47	22.7
Total	207	100

Lecturers' Beliefs and Readiness towards Technology-assisted Student-centered Learning

Referring to [Table 2](#) for portraying the beliefs and readiness of Malaysian lecturers towards the implementation of Technology-assisted student-centered learning (TA-SCL), it is found that the lecturers show high level of agreement on beliefs and readiness to carry out TA-SCL. In terms of belief, [Table 2](#) demonstrates the level of their agreement and disagreement towards the five items asked to them in the questionnaire. It depicts that 37.72% strongly agreed and 41.16% of the participants agreed and believed in TA-SCL as an approach that will improve students' academic achievement, enhance students' communication skills, provide teachers with chances to design flexible and creative learning activities, equal students' educational opportunities, and offer a lot of exposure to foster students' autonomous learning. However, still a few number of participants (2.5%) disagreed and strongly disagreed (1.5%) to implement the TA-SCL approach in their teaching activities. The higher disagreements are in terms of the effect of TA-SCL on providing students with equal educational opportunities and on students' autonomous learning.

With regards to readiness, [Table 2](#) further presents that approximately 74.5 % of the participants strongly agreed and 18.05% of them agreed to the four items indicating their readiness to implement TA-SCL. In detail, most of the participants (74.5%) strongly agreed and 18.05% of them agreed with the four items asked in the questionnaire. They are ready to invest their time to prepare and implement learning activities using TA-SCL, to improve their capacity on TA-SCL, and to join trainings and seminars relevant to preparation and implementation of TA-SCL. This finding discloses that the participants are at a high level of readiness to implement TA-SCL approach in their teaching activities. Also, it indicates that they are having significant degree of confidence to successfully enhance their students' competence using TA-SCL approach. However, some participants

show disagreement towards the four items of readiness. A total of 5.2% disagreed and 2.25% of them strongly disagreed. The percentage (5.2% and 2.25%) shows the level of lecturers' readiness to implement TA-SCL in their teachings.

Table 2. Lecturers' Beliefs and Readiness

Items	SA	A	D	SD	
Beliefs					
1	I believe that TA-SCL will improve students' academic achievement.	113 (54.5%)	84 (40.6%)	7 (3.4%)	3 (1.5%)
2	I believe that TA-SCL will develop students' communication skills.	107 (51.9%)	91 (43.6%)	5 (2.5%)	4 (2.0%)
3	I believe that TA-SCL will allow me to design more flexible and creative teaching-learning activities.	89 (43%)	96 (46.4%)	13 (6.3%)	9 (4.4%)
4	I believe that TA-SCL will offer a lot of exposure for students to foster autonomous learning.	46 (22.2%)	84 (40.5%)	48 (23.2%)	29 (14.1%)
5	I believe that TA-SCL will provide my students with equal educational opportunities.	35 (17%)	72 (34.7%)	85 (41.1%)	15 (7.2%)
Total		37.72%	41.16%	15.3%	5.84%
Readiness					
1	I am willing to manage my daily schedule to prepare learning activities using TA-SCL approach.	146 (70.5%)	51 (24.7%)	6 (2.9%)	4 (1.9%)
2	I am willing to dedicate my knowledge and efforts to implement learning activities using TA-SCL approach.	131 (63.3%)	44 (21.3%)	21 (10.1%)	11 (5.3%)
3	I am willing to learn a lot of sources to improve my capacity on learning using TA-SCL approach.	164 (79.2%)	32 (15.5%)	10 (4.9%)	1 (0.4%)
4	I am willing to join trainings and seminars relevant to preparation and implementation of TA-SCL approach.	176 (85%)	22 (10.7%)	6 (2.9%)	3 (1.4%)
Total		74.5%	18.05%	5.2%	2.25%

Notes: TA-SCL (Technology-assisted Student-centered Learning); SA (Strongly Agree); A (Agree); D (Disagree); SD (Strongly Disagree)

Discussion

In line with the two research questions, the results of this study show that Malaysian lecturers hold high level of beliefs to implement technology-assisted student-centered learning approach in their universities. Results of data analysis also depict that they are at a significant degree of readiness to carry out teaching activities using the approach. Hence, the attitudes of Malaysian lecturers seem positive towards the practice of TA-SCL in university context. This finding implies that the lecturers have already been familiar with the use of technology for educational purposes, particularly to assist their teaching activities. This makes sense and relevant to the findings of their demographic data, in which most of the lecturers participated in this study were at the age of 31-35 years old. In such ages, they are considered as digital natives and their daily routines should closely be related to the use of technology (Chen & Tsai, 2021). For sure, technology has a crucial role to support their performance as a lecturer who works in the twenty-first century of academic environment in higher education institution (Mehrvarz et al., 2021; Samsudin, 2021).

The participants' positive attitudes towards TA-SCL found in this study is relevant to the finding of [Katawazai \(2021\)](#) and [Osman et al. \(2015\)](#) which reveal that the participants had very favorable attitudes on the implementation of TA-SCL approach. However, in terms of statement 5 on beliefs that TA-SCL could provide equal educational opportunities for students, the participants of this study discovered disagreement (41.1%). Almost half of the participants showed criticism towards this statement by showing disagreement. What does it imply? The possible reason for this finding may rely on current situation of socio-cultural aspect in Malaysia, where not all students have privileged access to technology due to some constrains such as economy, lack of internet facility, and limited access to digital devices. This finding is supported by [Munir et al. \(2021\)](#) and [Yusuf \(2020\)](#) who reveal five major challenges faced by teachers and students in Malaysia during the use of technology in online learning, i.e. lack of students' focus and motivation, dissatisfied digital platforms used in online learning, limited access to learning tools, lack of internet resources, and ineffective learning activities. Hence, it is very reasonable if the participants of this study believed that TA-SCL approach have not yet given significant impact on equal education opportunities for students in Malaysia.

With regards to beliefs, this study discloses that Malaysian lecturers felt and believed TA-SCL as an effective and flexible learning approach in today's digital era compared to teacher-based learning activities. It is in line with the current paradigm of teaching that students play the most crucial role in the process of learning, and they are free to choose what to learn and how to learn on particular materials ([Andersen & Andersen, 2017](#); [Capone, 2022](#); [Hannafin et al., 2014](#); [Shadiev & Dang, 2022](#)). Learning by TA-SCL approach enables students to have more exposure to the process and actively engage in learning activities ([Bahari, 2022](#); [Ceylan & Kesici, 2017](#)). This statement is empirically proven by this study that Malaysian lecturers strongly believed TA-SCL offers a lot of opportunities to foster autonomous learning, to manage their learning process, and evaluate the results of learning. This finding is also in line with [Abdigapbarova and Zhiyenbayeva \(2022\)](#) and [Prifti \(2022\)](#) that use of technology in informal learning context could enhance the level of independency performed by students.

Moreover, about the readiness, this study also depicts a high level of the lecturers' readiness to carry out TA-SCL approach in their teachings. This finding means that they are willing and totally ready to dedicate their time preparing and implementing learning activities using TA-SCL approach. Moreover, they are also ready to learn new insights and knowledge, as well as join trainings and seminars to improve their competency related to teaching practice using TA-SCL approach. High level of teachers' readiness to carry out learning with specific approach is already half of journey to the successful education process ([Temban et al., 2021](#); [Zhang & Zhou, 2022](#)). This finding about readiness is consistent to [Katawazai \(2021\)](#) who reveals that Afghan lecturers were at positive perception toward the readiness to implement student-centered learning approach.

This study leaves some implication to the use of technology for educational purpose. Can technology really save us? It may become a question arising in the heads of educational stakeholders (more specific teachers and lecturers), particularly when education system was greatly affected by the pandemic of COVID-19 during the recent years. Of course, it is undeniable that technology provides both positive and negative impacts on online learning process conducted due to the global pandemic. In one side, technology plays crucial role to assist the implementation of online learning to ensure the continuity of education. It offers a lot of benefits and features to create flexible and creative learning activities. On the other side, it often causes ineffectiveness in learning activities due to some challenges such as availability of facilities, lack of internet resources, low motivation of students, and poor quality of teacher-student and student-student interaction. Therefore, through this paper, the authors are saying that technology integration in education is a must, but we have to be aware of its challenges so that we can overcome potential problems that may occur during the process of learning.

Conclusion

The current study explores Malaysian lecturers' beliefs and readiness towards the application of technology-assisted student-centered learning (TA-SCL). Drawing on survey research, in short, this study yields two significant findings. First, Malaysian lecturers hold high level of beliefs on the implementation of TA-SCL. Second, the lecturers also possess significant degree of readiness to implement the new approach in their teaching activities. Based on these findings, the attitudes of the Malaysian lecturers are positive, and they tend to have willingness to carry out this approach in their education process. This study contributes to the literature enhancement on TA-SCL in Malaysian context, which still remains unexplored. Practically, this study offers fruitful insights for university stakeholders in Malaysia to foster TA-SCL in hybrid learning activities.

Despite of the results, this study acknowledges several limitations. First, this study invites lecturers in Kuala Lumpur Malaysia to depict the general view about beliefs and readiness to implement TA-SCL. Although the result can portray the overall lecturers' perception on TA-SCL, larger number of participants from other area should be considered in the future research. Hence, it will yield more comprehensive results about Malaysian lecturers' beliefs and readiness on TA-SCL. Second, other variety of data collection techniques are required to depict more in-depth understanding about how the lecturers apply technology integration in their teaching practices to develop student-centered learning. In this context, future research is directed to explore in a deeper investigation on how they carry out the teaching practices using observation and interviews in qualitative research design. It is a worthy investigation to depict rich understanding about the issue of TA-SCL in Malaysian education context.

References

- Abdigapbarova, U., & Zhiyenbayeva, N. (2022). Organization of student-centered learning within the professional training of a future teacher in a digital environment. *Education and Information Technologies*, 27(6), 1-15. <https://doi.org/10.1007/s10639-022-11159-5>
- Ahmed, V., & Opoku, A. (2022). Technology supported learning and pedagogy in times of crisis: the case of COVID-19 pandemic. *Education and information technologies*, 27(1), 365-405. <https://doi.org/10.1007/s10639-021-10706-w>
- Andersen, I. G., & Andersen, S. C. (2017). Student-centered instruction and academic achievement: Linking mechanisms of educational inequality to schools' instructional strategy. *British Journal of Sociology of Education*, 38(4), 533-550. <https://doi.org/10.1080/01425692.2015.1093409>
- Asoodeh, M. H., Asoodeh, M. B., & Zarepour, M. (2012). The impact of student-centered learning on academic achievement and social skills. *Procedia-Social and Behavioral Sciences*, 46, 560-564. <https://doi.org/10.1016/j.sbspro.2012.05.160>
- Bahari, A. (2022). Affordances and challenges of technology-assisted language learning for motivation: A systematic review. *Interactive Learning Environments*, 30(1), 1-21. <https://doi.org/10.1080/10494820.2021.2021246>
- Benlahcene, A., Lashari, S. A., Lashari, T. A., Shehzad, M. W., & Deli, W. (2020). Exploring the Perception of Students Using Student-Centered Learning Approach in a Malaysian Public University. *International Journal of Higher Education*, 9(1), 204-217. <https://doi.org/10.5430/ijhe.v9n1p204>
- Bujang, S. D. A., Selamat, A., Krejcar, O., Maresova, P., & Nguyen, N. T. (2020, April). Digital learning demand for future education 4.0—Case studies at Malaysia education institutions. *In Informatics*, 7(2), 13-23. <https://doi.org/10.3390/informatics7020013>
- Capone, R. (2022). Blended learning and student-centered active learning environment: a case study with STEM undergraduate students. *Canadian Journal of Science*,

- Mathematics and Technology Education*, 22(1), 210-236. <https://doi.org/10.1007/s42330-022-00195-5>
- Ceylan, V. K., & Kesici, A. E. (2017). Effect of blended learning to academic achievement. *Journal of Human Sciences*, 14(1), 308-320. <https://www.j-humansciences.com/ojs/index.php/IJHS/article/view/4141>
- Chen, C. H., & Tsai, C. C. (2021). In-service teachers' conceptions of mobile technology-integrated instruction: Tendency towards student-centered learning. *Computers & Education*, 170, 104224. <https://doi.org/10.1016/j.compedu.2021.104224>
- Creswell, J. W. (2014). Educational research: Planning, conducting, and evaluating qualitative and quantitative research.
- Degner, M., Moser, S., & Lewalter, D. (2021). Digital media in institutional informal learning places: A systematic literature review. *Computers and Education Open*, 3, 100068. <https://doi.org/10.1016/j.caeo.2021.100068>
- Dunbar, K., & Yadav, A. (2022). Shifting to student-centered learning: Influences of teaching a summer service-learning program. *Teaching and Teacher Education*, 110, 103578. <https://doi.org/10.1016/j.tate.2021.103578>
- Fugard, A. J., & Potts, H. W. (2015). Supporting thinking on sample sizes for thematic analyses: a quantitative tool. *International Journal of Social Research Methodology*, 18(6), 669-684. <https://doi.org/10.1080/13645579.2015.1005453>
- Hannafin, M. J., Hill, J. R., Land, S. M., & Lee, E. (2014). Student-centered, open learning environments: Research, theory, and practice. In *Handbook of research on educational communications and technology* (pp. 641-651). Springer, New York, NY. https://doi.org/10.1007/978-1-4614-3185-5_51
- Hight, M. O., Nguyen, N. Q., & Su, T. A. (2021). Chemical anthropomorphism: acting out general chemistry concepts in social media videos facilitates student-centered learning and public engagement. *Journal of Chemical Education*, 98(4), 1283-1289. <https://doi.org/10.1021/acs.jchemed.0c01139>
- Izhar, N. A., Al-Dheleai, Y. M., & Ishak, N. A. (2021). Education continuation strategies during COVID-19 in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 11(4), 1423-1436. <http://dx.doi.org/10.6007/IJARBS/v11-i4/9840>
- Katawazai, R. (2021). Implementing outcome-based education and student-centered learning in Afghan public universities: the current practices and challenges. *Heliyon*, 7(5), e07076. <https://doi.org/10.1016/j.heliyon.2021.e07076>
- Khoury, O. (2022). Perceptions of Student-centered Learning in Online Translator Training: Findings from Jordan. *Heliyon*, 8(6), e09644. <https://doi.org/10.1016/j.heliyon.2022.e09644>
- Lee, E., & Hannafin, M. J. (2016). A design framework for enhancing engagement in student-centered learning: Own it, learn it, and share it. *Educational technology research and development*, 64(4), 707-734. <https://doi.org/10.1007/s11423-015-9422-5>
- Mehrvarz, M., Heidari, E., Farrokhnia, M., & Noroozi, O. (2021). The mediating role of digital informal learning in the relationship between students' digital competence and their academic performance. *Computers & Education*, 167, 104184. <https://doi.org/10.1016/j.compedu.2021.104184>
- Muñoz, J. L. R., Ojeda, F. M., Jurado, D. L. A., Peña, P. F. P., Carranza, C. P. M., Berríos, H. Q., ... & Vasquez-Pauca, M. J. (2022). Systematic Review of Adaptive Learning Technology for Learning in Higher Education. *Eurasian Journal of Educational Research*, 98(98), 221-233. <https://www.ejer.info/index.php/journal/article/view/707>
- Munir, F., Anwar, A., & Kee, D. M. H. (2021). Online Learning and Students' Fear of COVID-19: Study in Malaysia and Pakistan. *International Review of Research in Open and Distributed Learning*, 22(4), 1-21. <https://doi.org/10.19173/irrodl.v22i4.5637>
- Osman, S. Z. M., Jamaludin, R., & Iranmanesh, M. (2015). Student centered learning at USM: What lecturer and students think of this new approach?. *Journal of Education and*

- Practice, 6(19), 264-277.
<https://www.iiste.org/Journals/index.php/JEP/article/view/24188>
- Prifti, R. (2022). Self-efficacy and student satisfaction in the context of blended learning courses. *Open Learning: The Journal of Open, Distance and e-Learning*, 37(2), 111-125. <https://doi.org/10.1080/02680513.2020.1755642>
- Qutieshat, A. S., Abusamak, M. O., & Maragha, T. N. (2020). Impact of blended learning on dental students' performance and satisfaction in clinical education. *Journal of dental education*, 84(2), 135-142. <https://doi.org/10.21815/JDE.019.167>
- Rollakanti, C. R., Naidu, V. R., Manchiryal, R. K., & Polaju, K. K. (2020). Technology-Assisted Student-Centered Learning for Civil Engineering Students. In *Sustainable Development and Social Responsibility—Volume 1* (pp. 179-185). Springer, Cham. https://doi.org/10.1007/978-3-030-32922-8_18
- Sabah, S., & Du, X. (2018). University faculty's perceptions and practices of student centered learning in Qatar: Alignment or gap?. *Journal of Applied Research in Higher Education*, 10(4), 514-533. <https://doi.org/10.1108/JARHE-11-2017-0144>.
- Samsudin, M. A. (2021). Digital Learning Landscape in Malaysia during the COVID-19 Pandemic: The Perspective of Ecological Techno-Subsystem Theory. *Journal of International Cooperation in Education*, 24(2), 131-151. <http://doi.org/10.15027/51953>
- Sarvary, M. A., Castelli, F. R., & Asgari, M. (2022). Undergraduates' experiences with online and in-person courses provide opportunities for improving student-centered biology laboratory instruction. *Journal of Microbiology & Biology Education*, 23(1), 1-9. <https://doi.org/10.1128/jmbe.00289-21>
- Shadiev, R., & Dang, C. (2022). A systematic review study on integrating technology-assisted intercultural learning in various learning context. *Education and Information Technologies*, 27, 6753-6785. <https://doi.org/10.1007/s10639-021-10877-6>
- Temban, M. M., Hua, T. K., & Said, N. E. M. (2021). Exploring informal learning opportunities via youtube kids among children during COVID-19. *Academic Journal of Interdisciplinary Studies*, 10(3), 272-272. <https://doi.org/10.36941/ajis-2021-0083>
- Tsao, S. F., Chen, H., Tisseverasinghe, T., Yang, Y., Li, L., & Butt, Z. A. (2021). What social media told us in the time of COVID-19: a scoping review. *The Lancet Digital Health*, 3(3), e175-e194. [https://doi.org/10.1016/S2589-7500\(20\)30315-0](https://doi.org/10.1016/S2589-7500(20)30315-0)
- Turdieva, M. J., & Olimov, K. T. (2021). Game Technologies as An Innovative Type of Student-Centered Education. *The American Journal of Social Science and Education Innovations*, 3(02), 183-187. <https://doi.org/10.37547/tajssei/Volume03Issue02-29>
- Wahyuningsih, E., & Baidi, B. (2021). Scrutinizing the potential use of Discord application as a digital platform amidst emergency remote learning. *Journal of Educational Management and Instruction*, 1(1), 9-18. <https://doi.org/10.22515/jemin.v1i1.3448>
- Wang, J., & Song, B. (2022). Impacts of Mobile-Game-Based Collaborative Prewriting on EFL Students' Individual Writing in Student-Centered Class Context. *The Asia-Pacific Education Researcher*, 31(1), 1-12. <https://doi.org/10.1007/s40299-022-00645-6>
- Yates, A., Starkey, L., Egerton, B., & Flueggen, F. (2021). High school students' experience of online learning during Covid-19: the influence of technology and pedagogy. *Technology, Pedagogy and Education*, 30(1), 59-73. <https://doi.org/10.1080/1475939X.2020.1854337>
- Yeung, M. W., & Yau, A. H. (2022). A thematic analysis of higher education students' perceptions of online learning in Hong Kong under COVID-19: Challenges, strategies and support. *Education and Information Technologies*, 27(1), 181-208. <https://doi.org/10.1007/s10639-021-10656-3>

- Yusuf, B. N., & Ahmad, J. (2020). Are we prepared enough? A case study of challenges in online learning in a private higher learning institution during the Covid-19 outbreaks. *Advances in Social Sciences Research Journal*, 7(5), 205-212. <https://doi.org/10.14738/assrj.75.8211>
- Zhang, R., & Zou, D. (2022). Types, purposes, and effectiveness of state-of-the-art technologies for second and foreign language learning. *Computer Assisted Language Learning*, 35(4), 696-742. <https://doi.org/10.1080/09588221.2020.1744666>