



Factors Affecting Online Learning for Undergraduate Students in Medical Records Major, Mahidol University

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Abstract

An efficient online teaching and learning system will influence the learning outcomes of students based on a variety of elements, such as the teacher, the student, the equipment, the technology, etc. This study's aims were to investigate the knowledge and understanding of lessons learned, teaching satisfaction, factors impacting online learning, challenges and suggestions for improving online teaching and learning management, and satisfaction with teaching. All the students enrolled in online courses of the Bachelor of Science Program in Medical Record during the first semester of the 2021 academic year were surveyed. The sample consisted of 108 participants who completed an online questionnaire (Google Form) and a focus group interview with representations of students from all courses (2 individuals each year, for a total of 8 individuals). The results indicated that the overall knowledge and comprehension of online learning lessons for all subjects averaged a 6.62 score (10 score), with the highest level of satisfaction being associated with online teaching. Statistics Multiple regression analysis revealed that both the students' and teachers' levels of preparedness increased over time. This resulted in an increase in lesson comprehension that was statistically significant at the 0.05 level. The student readiness variables and the teacher's readiness for teaching and learning were capable of predicting the lessons' knowledge and comprehension. Student readiness (Beta = 0.485) and instructor readiness (Beta = 0.330) were highly predictive variables, together predicting 46.7 percent of the variance. The strategies for the development of online teaching and learning management systems should encourage teachers to be prepared for online teaching and learning. The use of Google Classroom in conjunction with the Webex program will assist in preparing teachers to use non-boring teaching techniques and modern technology to develop self-learning materials through E-learning or other knowledge sources such as Mux SPOC or MOOC, due to the fact that there are a variety of teaching styles and the ability to create content that can be applied to real-world situations. Teachers should promote connection or communication with their students.

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Introduction

Effective online teaching and learning depends on good content design, motivation, teacher-learner interaction, online student engagement, teacher support, and cutting-edge technology (Sobaih, 2020; Sun & Chen, 2016). Learners, teachers, and the institutions where they teach have an impact on online learning environment and satisfaction (Bolliger, 2008; Wiesenbergl & Stacey, 2005). In addition, the teaching skills and techniques of teachers are compatible with online systems (Coman et al., 2020). This study employs the concept of online learning, which includes students, instructors, courses, and organizational levels. Learners evaluate learner attributes, outcomes, and satisfaction. Courses and instructors evaluate the facilities, technologies, and characteristics of instructors. Organizational evaluations of accessibility and institutional support (Martin et al., 2020). Due to the nature of the students, they will assist in designing online courses to meet their needs. As success in online teaching can predict learners' learning outcomes (Kauffman, 2015), and learners' reflection (feedback) will lead to development, online learning may not be suitable for all students. In addition, learners' readiness for online learning consists of self-directed learning, motivation for learning, computer/Internet self-efficacy, learner control, and online communication self-efficacy (Hung, Chou, Chen, Own, 2010). Advantage of online learning is that students can learn at home and record lesson (Fatonia, et al., 2020). They do not have to travel. Some subjects are suitable for classroom learning to practice and to have face-to-face interaction between the students and the teachers.

With the prevalence of Coronavirus Disease 2019 (COVID-19) in Thailand, the number of epidemic outbreaks has increased. From March 2020 until the present, the government has a policy to prevent and control the spread of the infection in educational institutions by supporting the management of online learning (Webex). Online learning initiatives lack in being well-preparedness. All students and instructors need to adapt for online learning, for example, student readiness, teaching and learning technology, learner and instructor characteristics, and supporting facilities. This prompts teachers and students to modify their teaching methods, which may have an impact on student learning. The Bachelor of Science Program in Medical Records

emphasizes expected learning outcomes through a student-centered learning emphasis and a student-centered learning process. It also provides students with the opportunity to self-study, demonstrate knowledge, and construct self-knowledge (Constructivism) by allowing them to acquire practical and in-depth knowledge independently. The medical records course incorporates general education sciences such as basic science, medical science, medical disease coding, medical records, statistics, computers, and information technology, among others, into its curriculum. Effective online teaching and learning requires the availability of students, instructors, equipment, a suitable environment, and instructional techniques and methods. In addition, there are numerous modern teaching methods available today, such as online instruction via the Webex Meeting system in conjunction with Google Classroom or other forms of e-learning, etc. But the issue is frequently related to lesson knowledge, measurement and evaluation, student motivation and interest. In addition, this field offers both theoretical and practical classes in the classroom, including high-volume medical subjects, statistics with data analysis, and the use of computer programs, all of which require a comprehensive understanding and practice. The researcher is interested in studying the knowledge and understanding of the lessons reflecting learning outcomes, satisfaction, problems, and needs of students, as well as factors affecting online teaching and learning, because online learning requires students to adapt to their readiness to study. This is intended to serve as a guideline for the continued development of online teaching and learning of medical records management courses.

Objectives

1. Assess students' knowledge and comprehension of the online learning lessons.
2. Analysis of online teaching and learning satisfaction
3. Examine the factors influencing online learning.
4. Examine the issues and strategies surrounding the evolution of online teaching and learning management.

Conceptual Framework

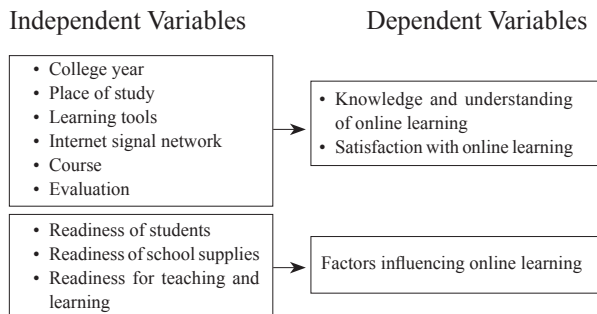


Figure 1 Conceptual Framework

Research Methodology

Population and Samples

The descriptive research analyzed all Bachelor of Science in Medical Record first-semester online students (188 students) enrolled in Years 1-4 during the first semester of the academic year 2021. A participant sample of 108 students were analyzed in the study and interviewed two student representatives per year, for a total of eight students. In particular, the positions of class leader and assistant class leader were selected in order to provide feedback, reflect on online learning issues, and adopt a preferred online instructional management style. This is a purposeful sampling, which includes the position of the class leader and the assistant head of the room, in order to provide feedback, reflect on the challenges of online learning, and determine the desired form of online teaching administration.

Research Instruments

An online questionnaire (Google Form) was used to obtain the following data: the knowledge, comprehension, student satisfaction, readiness of students, school supplies, teaching, and learning. using an online questionnaire The questionnaire was validated based on an index of item objective congruence (IOC=0.9) by three experts. The scale's reliability was 0.94 based on Cronbach's alpha reliability coefficient. The researcher consulted with experts to verify the appropriateness of language used in the research before usage. The qualitative data was conducted by interview form. The interview form was given to a qualified or relevant expert to verify content validity and was edited according to expert advice before usage.

Collection of Data

In the quantitative study data collection consisted of 108 students self-evaluation of the following topics: their knowledge, lesson comprehension, satisfaction, readiness for self-teaching, learning equipment, and teachers. In addition, access to course support, institutional support, problems, obstacles, requirements, and recommendations for online learning in all subjects, for a total of 23 subjects throughout the student's academic career. The 23 subjects can be divided into the following six subject groups: 1) Examples of general education subjects include General Education for Human Development, Social Studies for Human Development, Arts and Science for Human Development, English Language, Thai Language Arts, Common and Applied Mathematics, Introductory Biology, Life Skills for Modern Living, and Management Principles. 2) Examples of basic medical science subjects include Anatomy and Physiology, Medical Terminology, and Basic Clinical Science. Medical Coding Principles and Medical Coding in Diagnosis-Related Subjects are two academic medical coding groups. 4) Statistics courses are divided into the categories of Statistical, Analytical Statistics, and Research Methodology. 5) Programming for medical records and database management are two computer programming disciplines. 6) General knowledge subjects related to medical records include medical and public health information systems, medical and public health law, health care system knowledge management, and epidemiology.

In the qualitative data collection, students' opinions were obtained on learning problems in each subject, teaching and learning management, measuring and evaluating, and teaching characteristics were elicited through online interviews (Webex) and conducted with a focus group of students. The data was used to further explain the results of the quantitative data and as a guide for the development of teaching and learning management to meet the needs of each course's learners.

Variables studied

- General information, such as the college year, the location of online classes, the equipment used for classes, and the network signal used.
- Overall lesson comprehension score of 10.
- Student readiness (interests, intentions, location, time, and environment for online learning) overall score at 10.
- Availability of learning materials (online learning tools) overall score at 10.

- Readiness of teaching and learning management of teachers (methods and techniques of teaching, teaching media) overall score at 10.

- The readiness of teaching and learning management of teachers (teaching methods and techniques and teaching media) overall score at 10.

- There were five levels of satisfaction scores in each subject: highest (level 5), high (level 4), moderate (level 3), low (level 2), and lowest (level 1).

Data Analysis

Descriptive data analysis

- Lesson Cognitive Score (10 score) using statistics, percentage, mean, standard deviation, median

- Scores on student readiness, readiness of learning equipment, and teaching readiness of teachers (10 score) using statistics, percentages, averages, and standard deviations.

- There were five levels of satisfaction scores in each subject: highest (level 5), high (level 4), moderate (level 3), low (level 2), and lowest (level 1); using statistics, percentage, mean, standard deviation.

The analysis of factors affecting learning comprehension were students' learning readiness, learning equipment readiness, and teaching-learning readiness of teachers by using Multiple Regression statistics and analyzing qualitative data by content analysis method.

Ethics

This study was conducted through the Committee for Research Ethics, Faculty of Social Sciences and Humanities, Mahidol University (2020/122.2605).

Results

The sample consisted of 108 students studying in years 1-4 for a Bachelor of Science in Medical Record. The majority were first-year students (38.9%), followed by second-year (32.4%), third-year (14.8%), and fourth-year students (13.9%), respectively.. 33.4 percent of students used mobile devices, computers, and tablets to study online from their homes. 72.2 percent of students studied online via WIFI networks, with zero pupils exclusively using their mobile phones. 49.0 percent of students favored a hybrid model of online and on-campus instruction, followed by 41.7% of students who choose to learn at the facility and 9.3% of students who desired to study online (Table 1). The majority of assessment forms used several modalities, including Google forms, Google Classroom, presentations, reports, projects, and homework. Mux is utilized in certain courses, such as English language and Thai language.

Table 1 Sample group of medical record students

Sample group (n=108)	n	Percentage
Student		
First-year	42	38.9
Second-year	35	32.4
Third-year	16	14.8
Fourth-year	15	13.9
Online study location		
Private resident	95	88.0
University dormitory	3	2.8
Off-campus dormitories	10	9.2
School materials		
Notebook	11	10.2
Tablet	6	5.6
Mobile, Notebook	21	19.4
Mobile, Tablet	13	12.0
Notebook, Tablet	21	19.4
Mobile, Notebook, Tablet	36	33.4
Network		
Mobile Internet	28	25.9
WIFI	78	72.2
Lan	2	1.9
The learning style that students want		
Classroom learning	45	41.7
Online learning	15	9.3
Blended learning	53	49.0

The knowledge and understanding scores of online learning lessons showed that the overview of all courses had a cognitive score between 2 points and 10 points. General Education Courses and Knowledge of Medicine and Public Health Courses had the lowest scores. Medical Coding Academic Courses had the highest mean score of 8.23, followed by Computer Programs Academic Courses, Basic Medical Sciences Academic Courses, General Education Academic Courses, Statistics Academic Courses, and Medical and Public Health Knowledge Academic Courses, with mean scores of 7.75, 7.74, 7.47, 7.10, and 6.90, respectively (Table 2).

Table 2 Knowledge and understanding scores of online learning lessons classified by courses

Courses	Cognitive score (10 points)			
	Min	Max	Mean (SD)	Median (IQR)
General Education Courses	1	10	7.47(0.65)	8(7-9)
Basic Medical Sciences Courses	3	10	7.74(0.45)	8(7-9)
Medical Coding Academic Courses	5	10	8.23(0.12)	8(7-9)
Statistics Courses	3	10	7.10(1.05)	8(7-8)
Computer Programming Courses	2	10	7.75(0.67)	8(7-9)
Knowledge of Medicine and Public Health Courses	1	10	6.93(1.22)	7(5-8)
In the overview of all courses	2	10	6.62(1.51)	7(6-8)

The average satisfaction in the online teaching of all courses had high to the highest levels. The Medical Coding Course had the highest satisfaction level for

online instruction (mean score of 4.30), followed by the Basic Medical Sciences Course, the Computer Programming Course, the General Education Course, the Statistics Course, and the Medical and Public Health Knowledge Courses, with mean scores of 4.01, 3.91, 3.82, 3.70, and 3.68, respectively (Table 3).

and students, as well as students themselves, was distant and never occurred, particularly among first-and second-year students who had always studied online; this is a very problematic group project that must be coordinated with friends from different faculties, especially in general education courses. Instability in the internet signal can lead to difficulties during online

Table 3 Average level of satisfaction of online teaching classified by subject group

Courses	Satisfaction level *					Mean (SD)	Interpret
	Highest n (%)	High n (%)	Moderate n (%)	Low n (%)	Lowest n (%)		
General Education Course (n=473)	127 (26.85)	184 (38.9)	120 (25.37)	36 (7.61)	6 (1.27)	3.82 (0.95)	High
Basic Medical Sciences Course (n=103)	27 (26.21)	50 (48.54)	20 (19.42)	5 (4.85)	1 (0.97)	4.01 (0.86)	High
Medical Sciences course (n=40)	16 (40.00)	20 (50.00)	4 (10.00)	0 (0.00)	0 (0.00)	4.30 (0.65)	Highest
Statistics Course (n=78)	22 (28.21)	31 (39.74)	19 (24.36)	4 (5.13)	2 (2.56)	3.70 (0.98)	High
Computer Programming course (n=60)	14 (23.33)	24 (40.00)	17 (28.33)	4 (6.67)	1 (1.67)	3.91 (0.95)	High
Medical and Public Health Knowledge course (n=71)	16 (22.54)	27 (38.03)	21 (29.58)	2 (2.82)	5 (7.04)	3.68 (1.08)	High

* A mean score of 1.00–1.80 indicates the lowest level of satisfaction. A mean score of 1.81–2.60 indicates a low level of satisfaction. A mean score of 2.61–3.40 indicates a moderate level of satisfaction. A mean score of 3.41–4.20 indicates a high level of satisfaction. A mean score of 4.21–5.00 indicates the highest level of satisfaction.

When evaluating the preparation of teaching in the online system, it was determined that students were the least prepared, followed by instructors and learning equipment, respectively (Table 4).

Table 4 Online teaching readiness score

Courses	Readiness score (10 points)			
	Min	Max	Mean (SD)	Median (IQR)
Readiness of students	1	10	6.90 (1.82)	7 (6-8)
Availability of school supplies	2	10	7.73 (1.63)	8 (7-9)
Readiness of teaching and learning management of teachers	4	10	7.54 (1.26)	8 (7-8)

The study of factors influencing lesson comprehension revealed that as student and teacher readiness for teaching and learning improved, lesson comprehension increased statistically significantly at the 0.05 level. The student readiness variables and the teacher's preparedness for teaching and learning were capable of predicting the lessons' knowledge and comprehension. Student readiness (Beta = 0.485) and instructor readiness (Beta = 0.330) were the strongest predictive variables, together predicting 46.7 percent (Table 5).

The findings from the interviews with student representatives highlighted the challenges of teaching and learning administration in terms of teaching techniques, evaluation measures, learners' hurdles, and learners' requirements. The majority of respondents stated that the problem of interaction between instructors

Table 5 The results of a Multiple Regression analysis of factors influencing lesson cognition by using Multiple Regression statistic.

Variable	B	SE	Beta	t
Readiness of student	.401	.401	.485	5.149**
Readiness of school supplies	-.019	-.019	-.021	-.238
Readiness of teaching and learning management of teachers	.396	.396	.330	4.165**
Constant	1.015	.758		1.340

R = 0.683, R² = 0.467 F = 30.358, **p < 0.001

education or examinations. As for the availability of school supplies, it was discovered that disrupting settings, such as excessive noise and other obligations of the family, made it less important to concentrate on the lesson compared to when studying in class. In addition, students observed that the content of some courses was too extensive, that some courses overlapped, and that other courses had too many tasks. The majority of the time, each subject offered instructional resources for students or study aids for students to self-learn through Webex-recordable video replays. As for evaluation, there are a range of assessments in all topics, including scoring examinations, midterm exams, final exams, reports, presentations, and projects in some subjects. The majority are completed using Google Forms. The majority of respondents had no issues. Occasionally, the internet disconnected during tests. Some disciplines had no exams so students did projects instead. As far as equipment and tools in education are concerned, there are few issues. Since the institute supports WIFI internet

for certain students, those who do not have a computer can borrow one from the institute, and all students had access to the institute's services, such as Webex, Google Classroom, and so on.

According to student suggestions, teachers should utilize Google Classroom for communication, obtaining instructional resources, and collecting student work. Teachers should adjust course content to be applicable to work and daily life by employing non-boring teaching strategies and focusing on communication to foster students' comprehension of class activities, homework, and assignments. In addition, there is a transparent measurement and evaluation between the instructor and the student. Instructors should tailor their instructional activities to the online learning system. Creating LINE groups for each class subject to facilitate communication would be of great assistance. Students proposed that, if feasible, it is preferable to take tests at the university to prevent fraud in online exams, which are difficult to monitor.

Discussion

From a study of factors Affecting Online Learning for Undergraduate Students in Medical Records, the results can be discussed as follows:

1. Knowledge and comprehension of the online learning lessons

The knowledge and understanding scores of online learning lessons showed that General Education Courses and Knowledge of Medicine and Public Health Courses had the lowest scores. It can be explained that the two courses had broad content and used less. The Medical Coding Academic Courses had the highest mean score because all students paid attention to the specific and core knowledge. Previous studies found that effective online teaching and learning depends on good content design (Sobaih, 2020; Sun & Chen, 2016).

2. Online teaching and learning satisfaction

Most pupils study online at home, yet they prefer to study at school. Overall, the students' perceptions of their comprehension of the lessons and their happiness with each subject were rated as excellent.

This study indicated that the medical coding group had the highest degree of literacy in online learning, which corresponds to the highest level of happiness in the medical coding courses. It can be claimed that the students pay close attention since medical records are a specialized subject; having a teacher who is a medical professor who specializes in a specific field and

teaches in great detail provides students with a thorough grasp. In addition, the majority of the material consists of lectures and practical exercises. This is consistent with previous research indicating that the effectiveness of online instruction is dependent on format, teaching methods, subject content, student readiness, learning materials, instructor or instructor's expertise, teaching materials, classroom environment, students who enjoy learning, etc. (Nemanich et al., 2009; Burd & Buchanan, 2004). The Medical and Public Health Literacy courses had the lowest level of comprehension, which corresponded to the lowest level of satisfaction compared to the other courses, followed by the Statistics courses. According to student comments gleaned from interviews, the effectiveness of the instructor's lessons in certain disciplines is contingent on the repetition of certain content. This is a deficit that necessitates the growth of instructors and content in order to further enhance the curriculum. The communication between the teacher and the student on assignments is straightforward, particularly with measurement and evaluation. Learners' satisfaction is contingent upon learning results, instructional design, and learners' attributes (Kauffman, 2015).

3. Factors influencing online learning

When researching the elements influencing the knowledge and comprehension of the lesson, it was discovered that both the students' and instructors' preparedness for teaching and learning rose, resulting in a rise in the students' and instructors' knowledge and comprehension of the lesson. For the readiness of school supplies did not influence on knowledge and comprehension because of educational institutions supporting the management of online learning (Webex). This is consistent with previous study that found students, instructors, courses, and organizational levels affected on online learning (Martin et al., 2020). In addition, learners' readiness for online learning consists of self-directed learning, motivation for learning, computer/Internet self-efficacy, learner control, and online communication self-efficacy (Hung, Chou, Chen, Own, 2010).

4. Issues and strategies surrounding the evolution of online teaching and learning management

The student preparedness variable had a stronger influence on the teacher's readiness, which was consistent with student interviews in which they stated they could self-search the Internet to better comprehend lessons they did not grasp. Additionally, eager students

can study backwards from the internet video recordings of lectures. On the other side, the online learning of students whose circumstances are not suitable to study, such as loud noises, other distractions, or family obligations, can be impacted. This is consistent with previous research indicating that the effectiveness of online instruction is dependent on format, teaching methods, subject content, student readiness, learning materials, instructor or instructor's expertise, teaching materials, classroom environment, students who enjoy learning, etc. (Nemanich et al., 2009; Burd & Buchanan, 2004). Creating information that is student-friendly, increasing teacher-student interactions, aiding teachers, building online learning communities, and advancing technology are all goals of this initiative (Sun & Chen, 2016). Social technologies encourage interaction between students, instructors, and subject matter (Hamid et al., 2015). There is interaction in online classrooms (Tanis, 2020). Teach students to actively and visibly engage in positive interactions, and create a flexible classroom climate (Young, 2010). Quality of instruction in terms of the learning experience (Popa et al., 2020) Learners' learning efficiency will be enhanced through instructors' online teaching skills, teaching support, and the development of high-quality online subjects (Kim & Bonk, 2006).

This study performed in-depth interviews with students and analyzed quantitative data to provide extensive explanations for the assessment of all topics and year grades, allowing students to represent the course's overall learning outcomes. The drawback is that it is the student's self-evaluation, therefore the gathered information is the student's perspective. In addition, the sample group consisted of students from a single field of study, resulting in a lack of diversity due to a small sample size.

Suggestion

1. The guidelines for the development of online teaching and learning management systems should encourage teachers to be prepared for online teaching and learning. The use of Google Classroom in conjunction with the Webex program will assist in preparing teachers to use non-boring teaching techniques and modern technology to develop self-learning materials through E-learning or other knowledge sources such as Mux SPOC or MOOC, due to the fact that there are a variety of teaching styles and the ability to create content that can be applied to real-world

situations. Teachers should promote connection or communication with their students.

2. Teachers tailor their instructional activities to the online learning system. As for the correct distribution of tasks, it should be an individual assignment, not a group assignment. Each subject should have a line group for communication during the course, as well as an exam management system that prohibits tampering. Learners should ensure they have sufficient study time, a conducive study environment, study materials, learning tools, and Internet connectivity.

Recommendations for future research include a study comparing the anticipated learning results of online instruction and classroom management by measuring and evaluating prior to and after classes. Other factors affecting the effectiveness of online teaching and learning for Mahidol University's undergraduate students in all disciplines should be investigated.

References

- Bolliger, D.U., Wasilik, O. (2008). Factors influencing faculty satisfaction with online teaching and learning in higher education. *Researching education*. <https://doi.org/10.1080/01587910902845949>
- Burd, B.A., & Buchanan, L.E. (2004). "Teaching the teachers: teaching and learning online", *Reference Services Review*, Vol. 32 No. 4, pp. 404-412. <https://doi.org/10.1108/00907320410569761>
- Coman, C., Tîrnu, L.G., Mesesan-Schmitz, L., Stanciu, C., Bularca, MC. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective. *Sustainability*, 12, 10367.
- Hung, M.L., Chou, C., Chen, C.H., Own, Z.Y. (2010) Learner readiness for online learning: Scale development and student perceptions. *Computers & Education*. 55(3):1080-1090.
- Hamid, S., Waycott J., Kurnia, S., Chang, S. (2015). Understanding students' perceptions of the benefits of online social networking use for teaching and learning. *The Internet and Higher Education*. Volume 26, Pages 1-9.
- Heather Kauffman. (2015). A review of predictive factors of student success in and satisfaction with online learning. *Research in Learning Technology* Vol. 23. 26507, <http://dx.doi.org/10.3402/rlt.v23.26507>
- Fatonia, Arifiati N, Nurkayati E, Nurdawati E, Fidziah, Pamungkas G., et al. (2020) University students online learning system during Covid-19 pandemic: Advantages, constraints and solutions. *Sys Rev Pharm*.11(7):570-576.
- Kauffman, H. (2015). A review of predictive factors of student success in and satisfaction with online learning. *Research in Learning Technology*, 23: 26507 - <http://dx.doi.org/10.3402/rlt.v23.26507>

- Kim, K.J., & Bonk, C.J. (2006). The future of online teaching and learning in higher education: The survey says... Number 4, EDUCAUSE QUARTERLY. Page 22-30.
- Louise Nemanich, Michael Banks, Dusya Vera. (2009). Enhancing knowledge transfer in classroom versus online settings: The interplay among instructor, student, content, and context. *Decision Sciences Journal of Innovative Education*. Online 16 January 2009. <https://doi.org/10.1111/j.1540-4609.2008.00208.x>
- Martin, F., Sun, T., Westine, C.D. (2020). A systematic review of research on online teaching and learning from 2009 to 2018. *Computers & Education*. 159,104009, Available online 9 September 2020.
- Popa, D., Repanovici, A., Lupu, D., Norel, M., & Coman, C. (2020). Using mixed methods to understand teaching and learning in COVID 19 times. *Sustainability*, 12, 8726; doi:10.3390/su12208726
- Sobaih, A. E.E., Hasanein, A.M., Abu Elnasr, A.E. (2020). Responses to COVID-19 in higher education: social media usage for sustaining formal academic communication in developing countries. *Sustainability*, 12, 6520.
- Sun, A., & Chen, X. (2016). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research*, 15, 157-190. Retrieved from <http://www.informingscience.org/Publications/3502>
- Tanis, C.J. (2020). The seven principles of online learning: Feedback from faculty and alumni on its importance for teaching and learning. *Research in Learning Technology*, 28: 2319 - <http://dx.doi.org/10.25304/rlt.v28.2319>
- Wiesenberg, F. & Stacey, E. (2005). Reflections on teaching and learning online: Quality program design, delivery and support issues from a cross-global perspective.
- Young, S. (2010). Student views of effective online teaching in higher education. *Researching education*. https://doi.org/10.1207/s15389286ajde2002_2