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## ORIGINAL RESEARCH ARTICLE

# Students satisfaction, self-efficacy and achievement in an emergency online learning course

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This study aimed to evaluate the impact of an emergency online learning course on students' satisfaction, self-efficacy and achievement. This study used a convergent mixed methods approach with an action research design to explore students' experiences and outcomes in an emergency online science course. This study involved 25 voluntary participants from a private college in Manila, Philippines, who were enrolled in the Science, Technology and Society online course during the 2019–2020 academic year. Data were collected using a variety of instruments, including questionnaires, reflective journals and semi-structured interviews. The results showed that the developed emergency online learning course positively impacted students' satisfaction, efficacy and achievement. Students were satisfied with their interactions with classmates and teachers and the course content. They also expressed confidence in their ability to perform online tasks independently and master the subject through pre-recorded videos. This study suggests that effective student-teacher interaction, peer relationships, relevant and relatable course content, well-designed lesson materials, clear assessment tasks, differentiated tasks to meet individual learning preferences and teacher creativity are essential factors for student satisfaction, efficacy and achievement in emergency online learning courses.

**Keywords:** online learning; student satisfaction; self-efficacy; academic achievement; emergency education; mixed methods research

## Introduction

Distance education boasts a rich history, dating back to the 1840s, with the use of railways to deliver printed materials. The 1970s saw the emergence of open universities, paving the path for the 21st century's Massive Open Online Courses (MOOCs) and the personalised learning facilitated by transactional distance theory (Moore, 2022). Distance education thrived even before the COVID-19 pandemic, employing both asynchronous and synchronous tools for communication and collaboration (Lowenthal, 2022). Whilst online courses were already integral to some institutions' pre-pandemic program design, their purpose was not solely driven by the need for alternatives to face-to-face learning (Monyela, 2023).

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Despite offering flexibility and access to educational resources, online learning presented technological limitations, unsuitable environments, self-regulation difficulties and potential isolation (e.g., Kholis & Kusumawardani, 2022; Lemay et al., 2021; Yusuf, 2020). These challenges were particularly pronounced for students and teachers unfamiliar with online learning when the pandemic necessitated widespread adoption (Bączek et al., 2020; Baticulon et al., 2021). Fortunately, educators and students globally exhibited resilience and flexibility in navigating these unparalleled circumstances (Salsabila et al., 2020).

Studies consistently highlight three key ingredients for online learner success: satisfaction, self-efficacy and achievement (Artino, 2007; Wang et al., 2013). These factors intertwine, creating a supportive environment that motivates students and boosts performance (Im & Kang, 2019; Peechapol et al., 2018; Wang et al., 2013). For example, student satisfaction with online learning hinges on several aspects, including confidence in their academic abilities, prior experience with online learning and the perceived value of the course (Jan, 2015; Landrum, 2020; Lin et al., 2008; Long et al., 2021). Interestingly, Moore (1989) suggests that three types of interactions – learner-content, learner-instructor and learner-learner – can significantly impact satisfaction. These interactions can compensate for each other, with strong engagement in one area making up for weaker engagement in another (Anderson, 2003).

Self-efficacy, on the other hand, the belief in your ability to succeed, plays a crucial role in online learning, mediating the relationship between satisfaction, achievement and motivation (Callo & Yazon, 2020; Doménech-Betoret et al., 2017). This is especially true during sudden shifts to online learning, where strong online learning self-efficacy significantly predicts student satisfaction (Aldhahi et al., 2021). Beyond technical skills, human factors like comfort with the online environment, self-management abilities and confidence in your online learning capabilities are also crucial for success (Alshare et al., 2011). By nurturing these interconnected factors, educators can create a space where online learners thrive, achieving satisfaction, self-efficacy and academic success.

Whilst there is a growing body of research on online learning during the pandemic, several gaps remain to be addressed. Specifically, there is a need to identify strategies for improving the quality of online learning to minimise the gap between advantaged and underprivileged students (Baloran et al., 2021). Additionally, research is needed to evaluate the effectiveness of online learning during the pandemic and its impact on student performance (Suryaningsih & Pamujo, 2021; Zheng et al., 2021). Furthermore, investigating methods for preventing widening achievement gaps during the widespread adoption of emergency remote online learning is needed (Wu & Teets, 2021).

This study equates online learning with distance learning but specifies that online learning involves digital technology for instruction. On the other hand, emergency online learning is a rapid shift from traditional in-person instruction to online education, prompted by crises like the COVID-19 pandemic (Al-Kumaim et al., 2021; Dhawan, 2020). It is necessary to maintain educational continuity when physical classrooms are inaccessible. This study involved producing online course materials between May and June, which were then deployed in the mandatory Science Technology and Society (STS) course from July to August 2020. This course explores the intricate relationship between science, technology and society, delving into the production of scientific knowledge and its profound impact on our lives (Commission on Higher Education, 2013).


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The materials for the online course were designed quickly for online learning and then reviewed by an experienced college instructor. Each topic's online materials were organised in a specific way, beginning with a pretest to assess students' prior knowledge. Sometimes, Kahoot! games were the first task to get students interested in the topic. After the pretest, students watched a series of pre-recorded videos that ranged from 4 to 7 min long. In some cases, additional videos or readings were provided to enhance comprehension. To help students understand the lesson better, they answered open-ended or essay-type questions that required online search. Afterwards, students were encouraged to discuss a particular scenario or question on the discussion board, promoting communication and collaboration. Sometimes, essays and discussion boards were combined to create group activities. Finally, students took posttests to measure their learning progress and wrote reflective journal entries every week.

This study aims to investigate the effectiveness of emergency online learning courses in enhancing students satisfaction, self-efficacy and achievement in science courses. Hence, the research question is: How do emergency online learning courses impact students' satisfaction, self-efficacy and achievement in science course?

## Method

This action research utilised a mixed methods approach to investigate the impact of online learning materials on satisfaction, self-efficacy and achievement. This study section overviews the participants, data collection procedure and analysis.

### *Participants*

This study was conducted after obtaining ethical approval from the college's faculty research office. Twenty-five first-time online learners from a private college in Manila, Philippines, participated in the study during the 2019–2020 academic year. The study participants were over 18 years old, enrolled in an online Science, Technology and Society course, had no prior experience with online or distance learning and possessed access to the internet and technology devices such as computers and smartphones. An informed consent was obtained from all participants, who were informed of their right to withdraw from the study at any time. Data privacy was ensured through anonymization and aggregate presentation of results.

Table 1 shows the frequency of major/program and the sex of the participants in the research. There are 25 participants, of which 19 are female and 6 are male. The most popular major/program is Environment and Design, with 14 participants (56%). The least popular major/program is Diplomacy and Governance, with only 1 participant (4%). Overall, the table shows that the research study had a good representation of participants from different majors/programs and sexes from the college.

### *Data collection*

This study was conducted online over an 8-week term from July to August 2020 as part of the 2019–2020 academic year. The STS online learning course was developed a month before the term began, and students from various programs were enrolled.

Table 1. Participants' major or program and sex distribution.

| Major/program and sex | Frequency (%) |
|---|---|
| **Arts, culture and performance** | **5 (20)** |
| Female | 4 (16) |
| Male | 1 (4) |
| **Diplomacy and governance** | **1 (4)** |
| Female | 1 (4) |
| Male | 0 (0) |
| **Environment and design** | **14 (56)** |
| Female | 11 (44) |
| Male | 3 (12) |
| **Management and information technology** | **4 (16)** |
| Female | 2 (8) |
| Male | 2 (8) |
| **New media arts** | **1 (4)** |
| Female | 1 (4) |
| Male | 0 (0) |
| **Grand total** | **25 (100)** |
| **Female** | **19 (76)** |
| **Male** | **6 (24)** |

The course consisted of 10 lessons, with students taking a pretest before engaging in pre-recorded lectures, other activities and a post-test. The pretest and post-test scores were recorded. Students were also expected to write a reflective journal every week. At the end of the term, participants filled out questionnaires.

Additionally, a selected group of eight students, representing above-average, average and below-average performers, were interviewed using a semi-structured interview protocol. These interviews were conducted via Google Meet with an independent faculty interviewer, recorded with consent and followed the prescribed interview protocol. Each session lasted less than an hour. This study was conducted with the knowledge and permission of the school administrators, who granted consent to perform the study. The instruments used are the following:

### Student Satisfaction in Distance Learning Questionnaire (SS-DLQ)

This questionnaire measures student satisfaction in distance learning courses and was developed by Ali and Ahmad (2011). It consists of 24 items that measure four constructs: student-teacher interaction, student-student interaction, teacher performance and course content satisfaction.

### Self-Efficacy for Self-Directed Learning Questionnaire (SE-SDLQ)

This questionnaire measures students' beliefs or confidence in their ability to engage in self-directed learning (SDL). It was developed by Hoban and Sersland (1999) and


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consists of 10 items. Responses are rated on an 11-point scale ranging from zero (0) for 'no confidence' to ten for 'extremely confident'.

### Reflective journaling

Students were required to write reflections on their experience with the STS online course in their learning management system (LMS) blogs, responding to lead questions in every module. This reflective process involves an intrapersonal examination and exploration of their experience during online learning. It is the primary source of qualitative data used to examine student achievement.

### Semi-structured interview

To explore the students' perceptions of their satisfaction and self-efficacy in the STS online learning course, an interview protocol was developed based on the procedures outlined by Briggs and Murphy (2009). The protocol included an introduction, 26 interview questions and a debriefing process.

### *Data analysis*

Quantitative and qualitative data were collected and analysed independently. Descriptive statistics and the Wilcoxon signed-rank test of SPSS Version 21 were used to analyse the quantitative data. In contrast, the qualitative data were analysed using open coding in NVivo 12 Plus. The joint display was used to integrate both results. In interpreting the findings, Fetters (2020) proposed four possible combinations of fit: concordance when the data conform, expansion when the findings go beyond the conformed interpretation, complementarity when the findings differ but share a central idea and discordance when the findings conflict or contradict.

## Results

This section presents the main findings of this study. The presentation of the results starts with student satisfaction, student self-efficacy and the students' achievement using online learning materials in online STS course.

### *Student's satisfaction*

Table 2 presents the results, including quantitative, qualitative and mixed methods findings. It has four columns: constructs of student satisfaction, percentage of agreement, themes from qualitative data and the meta-inference that explains the integration of quantitative and qualitative findings.

The findings generally indicate satisfaction with interactions amongst classmates, interactions with the teacher and the course content. Students are pleased with the meaningfulness and relevance of the course, as well as the teacher's performance and timely feedback. However, there is some discordance regarding the workload, with some students finding it excessive. It is also suggested that the teacher ensure an equal distribution of group tasks amongst the students.

Table 2. Joint display of mixed data for student satisfaction in distance learning.

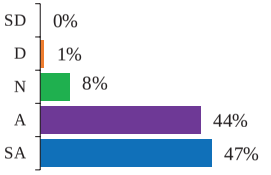
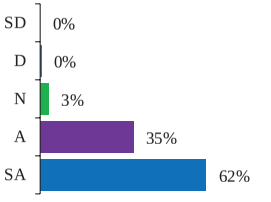
| Constructs of students satisfaction with distance learning | Quantitative findings (percentage agreement) $n = 25$ | Themes from qualitative data (interview references) | Metainference |
|---|---|---|---|
| **Student-student interaction satisfaction** |  | ***Peer Feedbacking***<br>'It's very unique to see their answers, and it's also nice to be able to comment and commend them to agree with their answers'. (05-MD)<br>***Course Netiquette***<br>'… we observe classroom netiquettes. We wait for each other to speak and listen to one another'. (02-CY) | **Concordance**<br>Most students are satisfied with their interactions with their classmates in the STS course. The interaction happens when they see each other's opinions on the discussion board. This interaction amongst the students should follow a set of netiquettes. |
| **Student-teacher interaction satisfaction** |  | ***Timely Feedback***<br>'Because sometimes, when we have a reflection or discussion board, the teacher comment on it. You actually ask questions on the discussion board'. (06-VJ)<br>***Ease of Communication***<br>' …when I'm really confused, that's the time that I start to ask questions. The teacher really replied fast using the chatbox' (07-CG) | **Concordance**<br>Most of the students are satisfied with interaction with their teacher in the course. Providing timely feedback is an important interaction for the students. The ease with which a student can communicate on various platforms also contributes to one's satisfaction when interacting with their teacher. |



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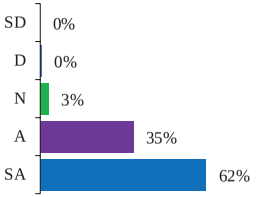
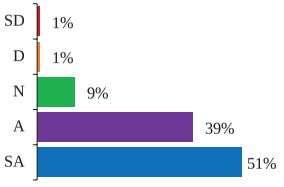
Table 2. (*continued*)

| Constructs of students satisfaction with distance learning | Quantitative findings (percentage agreement) $n = 25$ | Themes from qualitative data (interview references) | Metainference |
|---|---|---|---|
| **Teacher performance** |  | ***Ease of Communication***<br>'…especially during finals when we had our group project. The teacher were always there to answer. In less than 20 minutes, we got the answer. The teacher always see our messages, so we really appreciated that.' (04-DF)<br>***Unequal Division of Task in Groupworks***<br>'But I kinda had a hard time because I already divided the work into equal parts, but their parts they passed it a few hours before the submission deadline. So, I was like, "OK"'. (03-RA) | **Concordance**<br>Most of the students are satisfied with their teacher's performance on the course, possibly due to ease of communication.<br>**Expanding**<br>But the teacher should also have the responsibility of ensuring that the group tasks are equally divided amongst the group members. |
| **Course content** |  | ***Practical Knowledge***<br>'Today, we are facing a lot of environmental and health problems in the present time. So, the details and terms discussed during those lessons were the ones I always keep in mind until now'. (06-VJ)<br>***Large Number of Tasks***<br>'Admittedly, there are a lot compared to other classes'. (05-MD) | **Concordance**<br>Most students are satisfied with the course content because they think it is meaningful and relevant to their current circumstances.<br>**Discordance**<br>However, some students believe the workload in this course is excessive. |

Note: SA, Strongly Agree; A, Agree; N, Neutral; D, Disagree; SD, Strongly Agree.



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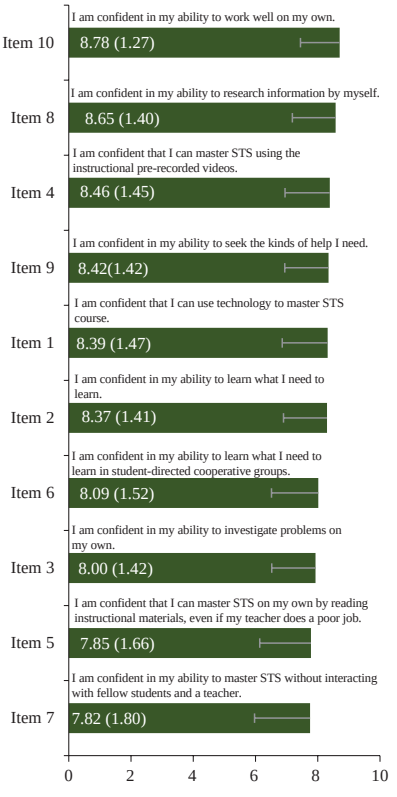
### *Student's self-efficacy for self-directed learning*

Table 3 displays the results for self-efficacy for SDL. The table is divided into two parts: quantitative and qualitative findings. The last column presents the metainferences between both quantitative and qualitative results.

Table 3. Joint display of mixed data on self-efficacy for self-directed learning.

| Quantitative findings<br>*N* = 25 (Mean and SD) | Themes from qualitative data<br>(interview references) | Metainference |
|---|---|---|
|  | ***Proficiency in using the LMS***<br>'I can't remember anything. Because I think I am already proficient enough using the LMS and in Google applications'. (05-MD)<br>***Preference for Working Alone***<br>'I prefer working alone, but I should have someone who can I compare my work with at least one'. (04-DF)<br>***Alignment of Instructional Materials***<br>'The videos really helped a lot, and the quizzes consisted of items that were thoroughly discussed in the videos. This made me feel safe'. (01-AP)<br>***Taking a Lead in Group Work***<br>'But I have to step up because nobody initiated. So, it got me scared because we might not have anything to present. I tried to initiate the conversation through group chat, and they were able to respond'. (05-MD)<br>***Teacher Presence***<br>'If there is no interaction with the teacher, there may be more errors. That's why it's important to always ask the teacher'. (03-RA) | **Concordance**<br>The data suggest that students are confident in performing the tasks online independently. One reason is that they are proficient in manipulating or navigating the school's LMS.<br>**Complementarity**<br>Furthermore, students are confident in working alone, but comparing their work to others is still good.<br>**Expansion**<br>Moreover, students can master the subject using the pre-recorded videos if it is aligned with the assessment. The design of the course and its implementation show significance in the course.<br>Also, the students are confident in performing in a group. However, confidence relies on the interaction of the group, on whoever starts to move and perform the task.<br>**Discordance**<br>Although the students believe they can work independently, teacher action and presence are necessary in their learning. |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The findings reveal that despite demonstrating confidence in various learning aspects, students' perception of confidence is nuanced, balancing self-reliance with teacher interaction. Students confidently perform online tasks independently, citing their proficiency in navigating the school's LMS. They also believe in the value of comparing their work to that of their peers. Additionally, students feel confident mastering the subject through pre-recorded videos if the content aligns with the assessments. The course design and implementation are perceived as significant contributors to their confidence. Furthermore, students express confidence in group work, emphasising the importance of group interaction and taking the initiative to initiate and complete tasks. However, there is discordance in the belief that independent work is sufficient, as students consider teacher action and presence necessary for their learning.

### *Student's achievement*

Table 4 presents lesson topics, the Wilcoxon signed-rank test results, reflective journal references and meta-inferences. By comparing the pretest and post-test scores, it resulted in significant score increases across all lessons, as indicated by positive ranks and z-scores larger than 1.96. All test statistics were negative, confirming significant difference with *p*-values under 0.05. Reflective journal references provide further insight.

The results show that lesson videos and differentiated teaching boost student engagement, but group communication remains a hurdle. Supplementary videos help students relate lessons to their daily lives, and the ability to rewatch pre-recorded lectures aids comprehension. Differentiated teaching methods and concise videos contribute to positive ranks. Some students face communication challenges in groups but still benefit from peer learning. Positive ranks are attributed to topic relevance, technology influence and support from lectures and videos.

## Discussions

This study emphasises the significance of student-teacher and peer interaction in online learning satisfaction. According to previous studies, students are more satisfied with online courses when they receive timely and constructive feedback, personalised and flexible instruction, and academic support from their teachers (Danielsen et al., 2011; Hesami & Kheiri, 2013; Seng & Ling, 2013). Likewise, students appreciate the opportunities to share and learn from their classmates, using various tools and platforms to communicate and collaborate effectively (Gasson & Waters, 2018; Ruane & Vera, 2016). Moreover, the presence and guidance of the teacher are crucial for ensuring the coherence, quality and meaning of the online learning experience (Aderinoye et al., 2007; Head et al., 2017; Tiberiu et al., 2023). Another factor influencing student satisfaction is the relevance and applicability of the course content to their personal lives, demonstrating the online curriculum's value and significance (Belet, 2017; Li, 2021). Consequently, to create satisfying online learning experiences, prioritise student-teacher interaction, collaborative peer work and engaging course content.

This study shows that effective task management, motivation and confidence impact students' SDL. According to Hecimovich and Volet (2011), students who are confident in their task performance are more motivated and achieve better outcomes.

Table 4. Joint display of mixed data on student achievement based on the differences of the scores.

| Lesson topics | Wilcoxon signed-ranks test results ($N = 25$) | Themes from reflective journals | Meta-inferences |
|---|---|---|---|
| The History of Science and Technology |  Z-score = -3.81 $p \leq 0.001$ | ***Efficient and Engaging Learning Experience*** 'The lessons are easy to pick up as the teacher gives brief and concise lessons. The video lengths are not very long and not very short, thus not losing the grip of interest of the listeners/students'. (RJ-06) | **Expansion** – The data show that most students belong to the positive rank. One of the reasons emphasized is that the student's attention in the lecture videos is stable because of their length. Curiosity also leads the students to a better understanding of the lesson. |
| Intellectual revolution |  Z-score = -3.34 $p \leq 0.001$ | ***Eagerness to Learn More*** 'I specifically want to learn more about the history of Charles Darwin's work. How his theory on human evolution was slowly accepted by society, knowing that during his time, the Church was very dominant'. (RJ-11) | |
| Information Technology |  Z-score = -4.43 $p = 0.000$ | ***Utilization of External Resource*** '…but after studying the topics, I noticed the additional video, which I find helpful in understanding the current state of AI and how IT is helping us to become more efficient'. (RJ-15) | **Concordance** – Many students from these topics are in the positive ranks. One reason is the supplementary videos helped the students relate the lesson to their daily lives. |
| Artificial Intelligence |  Z-score = -3.62 $p = 0.000$ | | |



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Table 4. (*continued*)

| Lesson topics | Wilcoxon signed-ranks test results ($N = 25$) | Themes from reflective journals | Meta-inferences |
|---|---|---|---|
| Genetic Engineering |  Z- score = -3.80 $p = 0.000$ | ***Focused Mastery through Repetition***<br>'…because I did watch all the videos not only once but three to four times to understand more about this topic, and my quiz was perfect as the result of focusing and understanding the lesson better'. (RJ-10)<br>***Optimized Learning through Segmentation***<br>'I appreciate the division of the videos into smaller clips. Because of this, the videos aren't too information-heavy on my part, and I get to retain the information much better'. (RJ-17) | **Concordance** – Still, the positive ranks dominated in both lessons. The students can rewatch the pre-recorded lecture videos until they have entirely acquired the concepts. Moreover, the lectures' division into smaller parts helped them focus on specific information. |
| Gene Therapy |  Z-score = -4.04 $p = 0.000$ | | |
| Biodiversity and Healthy Society |  Z- score = -4.04 $p = 0.000$ | ***Diverse Teaching Methods for Biodiversity***<br>'I liked how instead of a seatwork essay type of question for the Biodiversity module, we were able to do the math and calculate for the diversity in a specific area. It was very refreshing'. (RJ-17)<br>***Straightforward and Concise Presentations***<br>'I really appreciate how concise the pre-recorded videos are. No more beating around the bush and just going straight to the facts'. (RJ-06) | **Concordance** – The data show that most students belong to the positive ranks. The differentiation of the method can be one of the reasons. Also, the straight-to-the-point pre-recorded video lecture also contributes to the length of the video. |
| Climate Change |  Z-score = -4.06 $p = 0.000$ | | |

Table 4. (*continued*)

| Lesson topics | Wilcoxon signed-ranks test results ($N = 25$) | Themes from reflective journals | Meta-inferences |
|---|---|---|---|
| History of Science and Technology in the Philippines |  Z-score = -4.22 $p = 0.000$ | ***Supportive Group Dynamics in Communication***<br>'I'm having a hard time expressing my thoughts, and I was very disappointed with myself. But grateful to my groups because they are showing their support to me, especially AP, who is much well in speaking English than me'. (RJ-01)<br>***Engaging Interaction***<br>'It was fun interacting with my groupmates in the point group sharing and learning new laws that support science and technology in the Philippines'. (RJ-15) | **Complementarity** – The data show that a significant number of students are in positive ranks. However, some students are having problems when communicating with their group mates. On the other hand, although they experience challenges during group activities, they can learn from each other. |
| Science and Technology and Nation Building |  Z-score = -3.97 $p = 0.000$ | | |
| The Good Life |  Z- score = -4.32 $p = 0.000$ | ***Meaningful Connection to Personal Life***<br>'I liked how this week turned out because it was full of wisdom, and it also helped me in appreciating my life'. (RJ-13)<br>'As I've learned that technology can affect my mood, I will try my best to balance my usage of technology'. (RJ-15)<br>***Engaging and Accessible Learning Materials***<br>'Very interactive and easy to understand thanks to the pre-recorded and supplementary lecture videos'. (RJ-03) | **Concordance-**A significant number of students are in a positive rank. This can be explained by the relation of the topic to their personal life, how technology can influence it and the initiation and support that the pre-recorded lecture and supplementary videos have provided. |

Note. ■ Negative Ranks ■ Neutral Ranks ■ Positive Ranks



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However, confidence is not a fixed trait that students have or lack; rather, it is influenced by various factors related to the online learning environment. For instance, Aimah et al. (2017) and Villalon (2016) suggest that the quality and design of the lesson materials and the presence or absence of the teacher and peers can shape students' confidence levels. Therefore, clear expectations and guidance help students plan and execute their learning effectively (Zhang & Harris, 2010). Moreover, this study highlights how students' prior experience with technology can enhance their confidence in online learning, as they can use it automatically and efficiently (Hecimovich & Volet, 2011). This implies that teachers should also be proficient and confident in using technology to facilitate online learning, as their attitudes and behaviour can influence students' confidence (Fasso, 2013; Stroud et al., 2014). Hence, to create successful self-directed learners, teachers must facilitate a multi-pronged approach that addresses individual students and environmental factors.

This study revealed that the online course lessons consistently stimulated students' motivation by employing well-designed lesson materials that are aligned with cognitive load theory (De Jong, 2009; Moreno, 2007). This study also demonstrated how diagnostic tests in each lesson enhanced students' learning by helping them identify their knowledge gaps and focus on concepts needing improvement (Sieber, 2009). Furthermore, this study showed how tailored assignments, both individual and collaborative, fostered student engagement by aligning with their course program and catering to their distinct needs, thus nurturing their interest in the subject matter (Herrington et al., 2006; Huckstadt & Hayes, 2005; Scott et al., 2015). This online course used effective lesson design, personalised activities and targeted diagnostic tests that engaged learners.

The COVID-19 pandemic has posed unprecedented challenges for education, requiring online teachers to develop emergency courses to ensure continuity and quality of learning. To do so, teachers need to tap into their creativity, which can be fostered by adequate training and management (Tamsah et al., 2023). Research has shown that teachers' creativity can lead to better learning outcomes and alignment with emergency curriculum guidelines (Setyowati & Sumartin, 2021). Moreover, teachers' creativity can serve as a valuable source of inspiration and guidance for others who face similar difficulties in online learning (Mufaridah et al., 2022). Therefore, enhancing and supporting teachers' creativity is vital for responding to the changing and challenging educational landscape brought about by the pandemic.

Teacher creativity in emergency online learning extends beyond engaging lessons, innovative strategies, and a supportive environment ensuring student engagement and success. Besides designing and delivering engaging and interactive lessons, teachers must also adapt their instructional materials and assessments to the online platform (Horng et al., 2005; Wang et al., 2022). They must use innovative teaching strategies and technologies to maintain student interest and participation. Additionally, teachers must create or modify digital resources and develop alternative methods of assessing learning. They are also responsible for fostering a positive and supportive online learning environment, which includes building connections and engagement with students, promoting collaboration and communication amongst students, and addressing the social and emotional needs of the learners (Mao, 2022). Beyond lesson design, teacher creativity in emergency online learning becomes desirable and essential, requiring them to adapt, innovate and nurture to provide a comprehensive and practical online learning experience.

This study delves into various aspects of effective online learning experiences. It highlights the importance of student-teacher interaction, collaborative peer work and engaging course content for student satisfaction. Effective task management, motivation and confidence are key factors for SDL, influenced by the online environment and teachers' technology proficiency. This study also showcases an online course successfully employing well-designed materials, diagnostic tests and tailored assignments to motivate and engage learners. Finally, it emphasises the crucial role of teacher creativity in emergency online learning, encompassing adapted materials, innovative strategies and fostering a supportive environment to ensure student engagement and success.

Whilst this study offers valuable insights into the impact of emergency online learning on student satisfaction, self-efficacy and achievement, it has limitations that require cautious interpretation. The small sample size limits generalisability, and reliance on self-reported measures increases the possibility of social desirability bias. The COVID-19 context may have significantly influenced student experiences, potentially limiting applicability beyond the pandemic. Nevertheless, this study contributes meaningfully to the online learning literature and offers valuable insights for educators and policymakers.

## Conclusion

The developed emergency online learning course positively impacted students' satisfaction, efficacy and achievement. Students were satisfied with the interactions amongst classmates, interaction with the teacher and the course content. They also expressed confidence in their ability to perform online tasks independently, navigate the LMS and master the subject through pre-recorded videos. Additionally, students found the supplementary videos and differentiated teaching methods helpful. The students also praised the teacher's creativity in designing the course. The study findings suggest that the following factors are essential for student satisfaction, efficacy and achievement in emergency online learning courses: effective student-teacher interaction, peer relationships, course content that is relevant and relatable to students' lives, well-designed lesson materials, assessment tasks that provide students with a clear understanding of what to expect, differentiation of tasks to meet student's individual learning preferences and the creativity of teachers in designing and delivering the course.

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## Availability of data and materials

The data used and/or analysed in the current study are available from the author upon reasonable request.

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