Assessing student motivation in an involuntary online learning environment

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Abstract

Studies show that motivation to engage in learning activities may be more important for students studying in an online environment than for students in a face-to-face setting. A large number of studies successfully validated John Keller's ARCS model of motivation with its domains of attention, relevance, confidence and satisfaction. The present study employs the Course Interest Survey (CIS) based on the ARCS model and uses quantitative analyses, namely a principal component analysis and descriptive statistics to identify motivational problems in undergraduate tax students who were subject to emergency remote teaching. The study further explores which motivational domain shows the strongest association with these students' overall motivation to engage in online learning activities using a multiple logistic regression. The population consisted of third year students in an undergraduate accounting qualification at a South African Higher Education Institution. Results show that student attention proves to be the most problematic domain of motivation, while relevance appears to be highly rated. Attention may have suffered because of conditions such as a lack of a quiet place to study and internet connectivity issues. The domain which showed the strongest association with overall motivation is satisfaction. This is a positive outcome, indicating that most students enjoyed the experience and believed that they acquired useful knowledge and skills. The authors recommend that educators pay special attention to the relevance of a subject in students' everyday lives and future career goals as a strategy for keeping students motivated.

Keywords: ARCS model; online learning; taxation studies; student motivation; remote teaching.

Introduction

The study aims to explore final-year undergraduate tax students' motivation to engage with learning in an involuntary online teaching environment during an emergency remote teaching period. Emergency remote teaching is a shift from teaching face-to-face to an online environment during a time of crisis. It requires a quick transition to online learning so that teaching and learning are not interrupted (Hodges, Moore, Lockee, Trust & Bond, 2020). The need for the study arose from what appeared to be low levels of student motivation to participate in online learning activities with the implementation of emergency remote teaching during the COVID-19 lockdown restrictions. Khlaif, Salha and Kouraichi (2021) found that COVID-19 adversely affected student engagement in remote learning. Academics

worldwide complained about the lack of student engagement such as attending online classes, downloading learning materials, and participating in online lectures. Lecturers' anecdotal evidence, as well as literature on the impact of lockdown on student learning, support the claim that students lacked motivation to engage with learning on online platforms (see Ali, Narayan & Sharma, 2020; Chiu, 2022; Hoti, Dragusha and Ndou, 2022; Salas-Pilco, Yang & Zhang, 2022).

Instruction in vocationally oriented subjects such as taxation focuses on theoretical and practical skills because students are prepared for professional designations governed by professional bodies with differing educational and skills requirements (Viviers, De Villiers & Van der Merwe, 2022). Acquiring such skills requires the application of knowledge, which is best learnt through attempting case studies or problem-based

learning where an instructor guides while working step by step through a learning activity (Pence, 2023; Shuttleworth & Reyneke, 2017). Student success in such vocational studies are therefore not only dependent on studying from a text book. If students thus lack motivation to participate in an online learning environment when mere "book knowledge" is not sufficient to pass the subject, the question can be asked: "do educators know which domains in students' motivation are problematic and what that means for adjusting teaching strategies to improve motivation in these domains?" The research problem is that educators often overlooked student motivation in implementing learning systems (Wardani, Gunawan, Kusumaningrum, Benty, Sumarsono, Nurabadi, & Handayani, 2020; Filgona, Sakiyo, Gwany, & Okoronka, 2020). In the emergency remote teaching environment, where there was little time to consider what drives (or hinder) students' motivation to participate in online activities, this may be even more true. Therefore, there is merit to investigating all domains of students' motivation to engage in learning and practical skills development while studying online involuntarily. A deeper understanding of student motivation will enable educators to develop strategies for teaching in an online environment to improve motivation for student learning.

The COVID-19 pandemic exposed the unpreparedness of many higher education institutions to migrate online in a short period of time (Kofi-Adotey, 2020; Unesco, 2021). Proper planning and design of instruction are fundamental to online education (Adedoyin & Soykan, 2020), and this rapid migration raises questions about how effective many of these online deliveries are in engaging students in the learning process. "Finding the right balance between online and face-to-face teaching" (Times Higher Education, 2021), also referred to as a hybrid model of teaching, is a topical conversation for most university lecturers in present times. Further, it is evident that the "anywhere, anytime learning" phenomenon (McLaughlin, 2022) is here to stay, and a focus on "reimagining the classroom", where lecturers should incorporate the best of online into residential settings, is the future of teaching and learning (Harvard Task Force, 2022).

Students who are in a remote setting, as opposed to a face-to-face learning environment, are more likely required to perform independent tasks. Logan, Lundberg, Roth and Walsh (2017) found that the ability and motivation of these students may be more important than for students in a face-to-face setting. For the purpose of the present study, motivation is described by Keller (2009, p. 3) as to refer broadly to what people "choose to do and what they commit to do". We aim to detect problems in students' motivation to engage in learning activities in an online environment using Keller's ARCS model of motivation. The acronym 'ARCS' refers to Attention, Relevance, Confidence and Satisfaction as domains of motivation. The investigation is conducted within a group of final-year tax students enrolled for an undergraduate qualification in accounting at a higher education institution in South Africa. These students were unexpectedly forced to study in an online learning environment in their third year of study due to COVID-19 lockdown restrictions.

Contribution

Student motivation is a critical component of learning and student performance (Rost, 2006; Afzal, Ali, Khan & Hamid, 2010; Yilmaz, Sahin & Turgut, 2017; Bardach, Popper, Hochfellner & Lüftenegger, 2019). The emergency remote teaching period during 2020 and 2021 was unique – educators as well as students were unprepared as neither groups 'signed up' for an online teaching and learning environment. We contend that an investigation to detect problems in student motivation (and identifying what domain of motivation rated most problematic), as well as identifying the domains that made the strongest contribution to students' motivation during this period, provides unique insight into what drove or inhibited their motivation. Students did not know what to expect when teaching and learning suddenly shifted to an online environment, therefore their responses to our survey were not simply an evaluation of the course against best practice, but rather a reflection of their experience. Our study contributes to an understanding of the role the domains of motivation play in students' overall motivation, and this may provide insight into how we can improve online learning

activities. This study also contributes to advancing the literature on the use of the ARCS model and literature on student motivation in general.

Literature review

Since the COVID-19 disruption occurred, many scholars focused on different aspects related to teaching and learning during and after the lockdown period in their countries. Zhang, Carter, Qian, Yang, Rujimora and Wen (2022) used a bibliometric review to provide a holistic view of research that investigated online learning during COVID-19 in higher education globally. Zhang et al. (2022, p. 620) found "a wide array of topics, such as use of various technologies and strategies, redesigned curriculum, student perceptions and psychological impacts of the pandemic-imposed online learning". Their review included scholarly articles from 103 countries around the world.

A further search for scholarly literature published in 2021 and 2022 which focused on the effects of COVID-19 on teaching and learning and, more specifically, addressed elements of motivation or engagement, rendered many studies from around the world. A systematic review of studies published during 2020 and 2021 performed by Salas-Pilco, Yang and Zhang (2022) synthesises the findings from 23 articles on student engagement in Latin American higher education institutions during the COVID-19 pandemic. Their review aimed to explore the major characteristics of the behavioural, cognitive and affective dimensions of engagement. Salas-Pilco et al. (2022) report that students generally showed motivation to learn and found online courses motivating. In another study, Lo, Han, Wong and Tang (2021) found that blended learning, which combines face-to-face and e-learning components, enhanced students' engagement and their self-motivation.

On the other hand, Aguilera-Hermida (2020) explored factors influencing students' acceptance of emergency online learning. The factors analysed include attitude, affect, motivation, perceived behavioural control and cognitive engagement. She reports that her sample of students had a negative attitude towards online learning, which diminishes their self-efficacy and motivation. Similarly, Wilcox and Vignal (2020)

explored student experiences with emergency remote teaching and found that students perceived a "significant reduction in the level of interaction in their courses" which harmed their learning. They further found that almost 75% of their student sample (n = 112) reported a significant reduction in their motivation to do their schoolwork. Wilcox and Vignal (2020) urged instructors to be sensitive to reduced student motivation and to consider how they structure their course, taking into account students' situations while attempting to learn from home.

None of the studies referred to above focused exclusively on motivation or on motivation as a multi-dimensional construct during the emergency remote teaching period. Further, we could not find a recent study that used the ARCS model to explore student motivation in an emergency remote teaching setting. However, earlier studies on student motivation where the ARCS model was used validate the assumptions of the model and show that it is effective in identifying structural motivation concepts in an online environment (see for example Keller & Suzuki (2004), Cocea (2006), Izmirli & Izmirli (2015) and Kim & Frick (2011)). Ucar and Kumtepe (2020) also agree that the ARCS model is a valid and reliable model of learner motivation, but note that too little attention has been paid to the utilisation of the model in the online learning environment.

Studies using the ARCS model to determine the effects of the motivational domains are, for example, Izmirli and Izmirli (2015) who found that confidence was the motivational factor with the highest influence and satisfaction was the one with the lowest influence on online learning. Chang and Lehman (2002) found evidence to support that relevance enhanced students' motivation, and Ucar and Kumtepe (2020) found attention, confidence and satisfaction to be statistically significant for student motivation. Other studies using the ARCS model show that the design of teaching activities based on the ARCS model improve student motivation to complete online courses (Malik, 2014), while Colakoglu and Akdemir (2010) found that course design based on the ARCS model has more motivational benefits than for the traditional class.

Fang, Pechenkina and Rayner (2023, p. 9) postulate that if blended learning is the future of learning, "universities will need to reconsider their pedagogical strategies, processes and operational approaches". They recommend that lecturers will have to adopt new ways of teaching that incorporate active learning strategies to better engage students in blended learning environments. We believe that our study addresses a gap in the literature in focusing on the domains of motivation within an emergency remote teaching environment, and that by identifying the domains which show the biggest problems in students' motivation, educators can adopt strategies based on the ARCS model of motivation to improve student motivation and engagement with online learning activities, especially in situations where students are not used to an online learning environment or did not expect to be learning using regular online activities.

Theoretical framework

The present study adopts John Keller's ARCS motivational design theory as the theoretical framework. "Other motivational models or theories emphasise motivation in learning in general, such as learning performance, or by relating motivation to psychological aspects of learners, such as attitude" (Refat, Kassim, Rahman & Razali, 2020, p. 3). However, the ARCS model focuses on aspects of motivation as a result of the design and development of instructional materials and can also be used "to diagnose motivational problems in the existing instructions as well as the environment" (Refat et al., 2020, p. 4) and was therefore chosen as a relevant model for our study. The ARCS model is well known in education circles worldwide and has been used extensively by scholars to investigate motivation in learning, including online learning (Simsek, 2014; Keller & Suzuki, 2004). In an interview with John Keller, Simsek (2014, p. 92) captures Keller's response with regard to the main assumptions and principles of the theory as follows: "to have motivated students, their curiosity must be aroused and sustained (attention); the instruction must be perceived to be relevant to one's personal values or instrumental to accomplishing desired goals (relevance); the students must have the personal conviction that

they will be able to succeed (confidence); and the consequences of the learning experience must be consistent with the personal incentives of the learner (satisfaction)". Keller describes that the ARCS model leads to identifying specific motivational challenges that exist in a given situation (Simsek, 2014). In our study, we aimed to identify the specific motivational challenges that students experienced when having to engage with online learning.

"To be motivated means to be moved to do something" (Ryan & Deci, 2000, p. 54). It is widely acknowledged that not only do people's levels of motivation differ, but so do their reasons for being motivated (Ryan & Deci, 2000). The ARCS model is grounded in expectancy-value theory, reinforcement theory and cognitive evaluation theory (Keller, 2009, p. 34), and aims to provide a more comprehensive and holistic treatment of motivation. An overview of the four domains follows below.

Attention

Students' attention should be stimulated and sustained to keep motivation high. This attention should then be directed to the concepts or skills to be learned for learning to take place (Keller, 2009). Keller (2009) cautions that it is important to find the right balance between exciting students' senses, awakening a deeper level of curiosity, and preventing boredom without causing students to be hyperactive. What makes it more difficult is the fact that tolerance for stimulation differs from person to person – some get bored easily while some prefer an environment with few surprises.

When learning is suddenly shifted to an online environment, it is plausible that the novelty of learning using online platforms could stimulate the attention of learners (Keller & Suzuki, 2004). However, these novelty effects may be short-lived, leaving educators with the continuing problems of providing learning experiences that are stimulating and sustaining attention while still effective in promoting learning (Keller, 2016). In the present study, we investigate if students perceive that the online learning activities have captured and sustained their attention, or if lack of attention was

a contributing factor to students' low levels of motivation to engage with the learning activities.

Relevance

The classical question 'why do we have to do this?' is often asked by students and is indicative of the need to understand the relevance of the instruction. Keller (2009) makes the case that relevance is one of the most important influences in students' motivation to learn and pay attention.

Based on the expectancy-value theory postulated by Vroom in 1964 and Steers and Porter in 1983, Keller (2009) argues that people are more likely to pursue a desired outcome if such outcomes are aligned to their personal goals, motives and values. Although such alignment between outcome and personal goals is a form of extrinsic motivation, it is a more autonomous or self-determined form (Ryan & Deci, 2000). Studies have shown that "more autonomous extrinsic motivation is associated with greater engagement, better performance, less dropping out and higher quality learning" (Ryan & Deci, 2000, p. 63).

Students who are intrinsically oriented learn more effectively and are more highly motivated when learning (Chang & Lehman, 2002). In the present study, we took a closer look at the results of questions on students' intrinsic motivation versus those which measure extrinsic motivation.

Confidence

"People's behaviour is strongly influenced by their confidence in their ability to perform" (Ajzen, 1991, p. 184). Based on Badura's concept of self-efficacy, Keller (2008) proposes that when students believe they can master a learning task, motivation to learn appears to be greater. Dweck's (2019) research about the beliefs people hold about their abilities (or their mindsets) has shown how these beliefs can affect their motivation, achievement and well-being.

Keller (2016) states that confidence is built when students experience success and can attribute these successes to their own abilities and efforts rather than to luck. He warns that educators should set realistic expectations and concludes that perception of control is the mainstay for confidence.

In an online environment, anxiety and fear, which could be detrimental to confidence, are especially difficult to detect (Millman & Wessmiller, 2016). We aimed to measure students' confidence with questions pertaining to their belief in their own abilities to make their learning in the online environment work.

Satisfaction

Satisfaction as a component of motivation stimulates positive feelings about the learning experience (Keller & Suzuki, 2004) which in turn sustains desirable learning outcomes (Keller, 2016). These positive feelings are based on intrinsically and extrinsically rewarding outcomes.

Intrinsic motivation causes a person to act for the fun or challenge of the task, rather than external reward or pressure (Ryan & Deci, 2000). Keller (2009) explains that if the instructional content and learner activities are designed to be at an optimal level of challenge for the specific group of students and are perceived by them to be worthwhile, intrinsic satisfaction (or motivation) should follow.

Extrinsic motivation or satisfaction is enabled when "one feels externally propelled into action" (Ryan & Deci, 2000, p. 55). Ryan and Deci (2000) describe how individuals can react to external regulation based on the extent to which they identify with the regulation and integrate it with their own goals. This then leads to motivation lying on a continuum from being completely externally motivated (and thus passively involved in the learning process) to being more and more internally motivated (and thus actively committed to the learning process) (Ryan & Deci, 2000).

Most people will agree that many learning tasks are not inherently interesting or fun to do, and educators should therefore understand how to promote more active forms of extrinsic motivation in order to promote satisfaction with the learning experience. In an online environment, Izmirli and Izmirli (2015) report findings from several studies where it was found that clear

instructions, ease of use of online platforms, authenticity of activities, and instructor feedback were important factors influencing satisfaction in students. Elements measuring satisfaction in line with the assumptions of Keller's ARCS model were included in the present study's questionnaire.

Objective of the present study

The study aims to explore final-year undergraduate tax students' motivation to engage with learning activities and material in an online learning environment. Two specific objectives have been set to guide the empirical investigation:

1. To detect students' motivational problems when learning online by measuring the levels of the different domains of motivation in terms of the ARCS model.
2. To determine the motivational domains most closely associated with these students' self-rated level of motivation to learn and engage in an online learning environment.

Methods

The study was designed with a quantitative approach. A survey instrument based on Keller's Course Interest Survey (CIS) was developed to measure the four domains of the ARCS model in the sample of students. Keller (2009, p. 277) designed the CIS based on the ARCS model to estimate learners' motivational attitudes in the context of virtually any delivery system. Keller affirms that the CIS is useful in both synchronous and asynchronous online courses facilitated by an instructor. We obtained permission from Dr J Keller to use the CIS instrument. We reduced the number of questions from 34 to 26 and replaced the words "for this course" with "for this online tax module" in each question, where applicable. The main reason for removing some questions was that they could not be uniquely positioned for the online context. Another reason was that we wanted to keep the number of questions on each domain of motivation in the same range of six to seven questions per domain, and further aimed to keep the overall questionnaire as short as possible to prevent questionnaire fatigue.

Keller (2009, p. 281) reports that the internal reliability of the CIS is consistently satisfactory, with Cronbach's α for each subscale higher than 0.8 and the scale in its entirety higher than 0.9. For our study, Cronbach α = 0.872 for the entire scale after we removed three items which showed to not be highly correlated with the other scale items.

Our population was a group of final-year students registered at a South African university for a tax module in an undergraduate accounting qualification. They were purposefully chosen because of the vocational nature of taxation studies, which means the acquiring of practical skills during the study is important. The population consisted of 457 full-time students, most of whom completed their studies at the end of 2020. The demographics of the entire population show that 81.6% are between the ages of 20 – 24 and 14.7% between the ages of 25 – 28. The population further comprises 97.6% African students (Karedla, 2022).

Repeated messages were sent via WhatsApp and email to the students requesting them to complete an online questionnaire for research purposes. Only 82 students responded, resulting in a response rate of 17.94%. Although this is low, it is not uncommon. Researchers have commented on a seeming decrease in people's willingness to participate in research (Morton, Bandara, Robinson & Carr, 2012; Burgard, Kasten & Bosnjak, 2019). Nulty (2008) remarks that despite efforts to increase response rates, online surveys generally achieve much lower response rates than paper-based surveys. However, we do acknowledge that one possible reason for a low response rate is the fact that the survey was sent to students after they completed their course and graduated from university.

Analysis Techniques

Three main techniques for data analysis, using SPSS version 27, were employed: 1) a principal component analysis (PCA) to extract the components that most likely measure each of the domains of the ARCS model; 2) means and standard deviations for each group of statements measuring a domain of motivation; and 3) a multiple logistic regression to explore the

association between the four domains of the ARCS model and the level of participants' self-rated motivation. learning

Results and Discussion

The goal of the CIS instrument is to measure how motivated students are towards a particular course and not their general level of motivation towards learning (Keller, 2009, p. 277). The results are therefore indicative of how motivated the students were to participate in online learning activities in their tax module. We wanted to make sure that the items we include in the regression model measure the same underlying construct. PCA was used to identify those variables in the questionnaire that we found to most closely represent the domains of attention, confidence, relevance and satisfaction. Some items were removed from the scale when it became evident that they were not sufficiently representative of the domains we set out to determine.

For the 24 items on the CIS subjected to PCA, the suitability of the data was confirmed with a Kaiser-Meyer-Oklin value at 0.797 and a significant Bartlett's Test of Sphericity ($\rho < .001$).

After initial results, factor extraction resulted in five underlying factors or domains which explained an accumulated 60.7% of the variance in the data set. Following Oblimin rotation, the pattern matrix shows that seven items load strongly (above .56) on the 'satisfaction' domain. Five items load strongly (above .54) on the 'confidence' domain; four items load on the 'relevance' domain; and six items on the 'attention' domain.

After careful inspection of the items in comparison with Keller's original questionnaire, it was decided to retain only the items per motivational domain that had a factor loading higher than 0.5.

To get a view of how students perceived certain elements of the online learning experience, and to detect problems in students' motivation under the domains of the ARCS model, the results below in Figure 1 show the mean scores per domain. The CIS utilises a Likert scale as follows: 1 = Not true; 2 = Slightly true; 3 = Moderately true; 4 = Mostly true; and 5 = Very true. See Appendix 1 for the complete questionnaire.
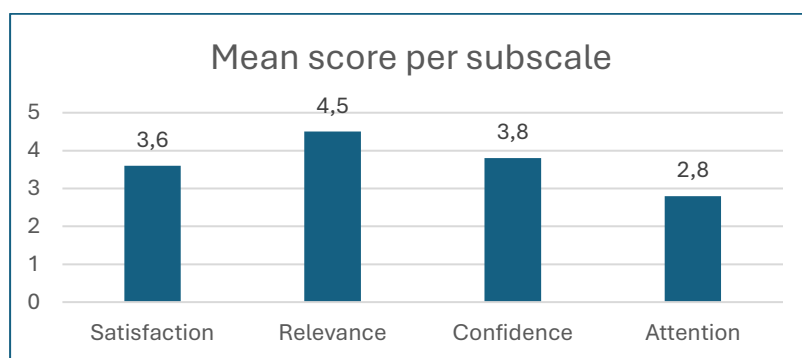
.

Figure 1   Mean score per subscale of motivation

Relevance had the highest overall average score followed by confidence, satisfaction and attention. A study by Kim and Frick (2011) on the predictors of motivation in a self-directed e-learning programme also found that perceived relevance was the best predictor of motivation at the start of the course. The high score for relevance of 4.5 in our study indicates that the students perceived the module content as very relevant to their personal goals and that they realise the

importance of the module for their future careers. This is in contrast with the results from a study by Ucar and Kumtepe (2020), who found that the relevance domain appears to not influence distance learning environments. We believe that the vocational nature of the tax course makes the practical relevance of instruction especially important for students.   Bardach et al. (2019) also concluded in their study with vocational students that practical relevance was linked to student motivation, and they urged educators in

vocational education to emphasise practical relevance in their instruction.

The most worrisome domain of motivation is attention, with a low mean score of only 2.8. It points to the fact that lecturers should consider new strategies to capture and sustain students' attention throughout a lecture. Attention as a motivational domain is difficult to measure because of people's tolerance for stimulation (Keller, 2009). We consider possible reasons for this low score later in our discussion of the results.

Our results show mean scores below 4 for satisfaction and confidence. Although a study by Izmirli and Izmirli (2015) found confidence to be the motivational factor with the highest rating, they also found satisfaction to be a problematic domain. However, Ucar and Kumtepe's (2020) results indicate attention, confidence and satisfaction to be statistically significant for student motivation. An interesting finding in the literature on confidence and satisfaction is that many studies found a positive relationship between confidence in using technology in learning and satisfaction with online learning (Landrum, 2020). Landrum (2020) argues that students' ability to use and navigate an online platform for learning seems to be a crucial element of satisfaction and success in an online course. It is thus plausible that if confidence was low in our sample of students, satisfaction with the course was negatively influenced.

Keller (2009, p. 45) explains that low confidence may be a result of "well-established fears of the topic, skill, or situation". In the present study, it is possible that the sudden move to an online learning environment may have created a 'situation' that prevented students from learning effectively, for example, having issues with devices and connectivity, studying in a noisy environment, struggling with using the online platform, etc. In support, we found a compilation of personal reflections from 66 contributors on the impact of COVID-19 in accounting education in 45 different countries around the world by Sangster, Stoner and Flood (2020). They reveal that challenges experienced by many students in coping with the move to an online environment because of COVID-19 lockdown restrictions include issues with internet access and affordability, power supply stability, and lack of suitable equipment or a quiet space to study.

With regard to the domain of confidence, we consider that the situation created by the rapid move to online learning (that is, lack of devices, connectivity issues, and struggling with using online platforms) may have resulted in students' low confidence in their own abilities and fear of failure. Keller and Suzuki (2004) explain that confidence is dependent on students' positive expectancies for success or how well students think they are performing in a course (Palmer & Holt, 2009). Supporting evidence to this was found in a 2020 university-wide survey with the undergraduate students of a faculty under a study conducted by the Division for Institutional Planning, Evaluation and Monitoring (DIPEM), which revealed that 63% of students believed that COVID-19 negatively disrupted their programme experience, while 57% further agreed that they found remote learning difficult (DIPEM, 2020). Given the fact that confidence is often associated with a person's feeling of personal control over being able to succeed at a task (Keller, 2009), it is likely that the students' experiences noted here may have negatively influenced their feelings of confidence. Keller (2009) further suggests that corrective feedback from lecturers will help students' perceptions of control increase. The survey by DIPEM (2020) referred to above further revealed that 32% of the students felt that lecturers did not comment usefully on their work – this fact may also have contributed to low levels of confidence in some students in the present study.

Students' feelings of satisfaction depend on extrinsic and intrinsic factors. Extrinsic factors may include "grades, opportunities for advancement, certificates and other material rewards" while intrinsic factors may include "accomplishments that enhance feelings of self-esteem, experiences of positive interactions with other people, having your views heard and respected, and from mastering challenges that enhance your feelings of competence" (Keller, 2009, p. 46). Ali, Narayan and Sharma (2020) further concur that in the online environment it is difficult to make personal connections with students and as a result, engagement in the learning

activity by some students will suffer. The mean score of 3.6 for satisfaction in the present study does not indicate whether intrinsic or extrinsic factors weighed the rating downwards. A closer inspection of the individual questions in the survey reveals that the average scores on the questions pertaining to intrinsic motivational factors are higher than for those questions pertaining to extrinsic motivation. Ryan and Deci (2000) confirm that students grow in knowledge and skills through acting on their inherent interests, and Keller (2009) also notes that if students place a high value on the relevance of a course, they will have less of a requirement for extrinsic rewards. It is a positive result that students appear to have enjoyed the course and felt that they have overcome the challenges of learning remotely.

The low score for attention as a domain of motivation deserves further discussion. Keller (2008) explains that it is a challenge to sustain attention because people adapt to routines and lose interest over time. He suggests that using variability is important to sustain attention. We believe that due to the sudden onset of teaching in an online environment, lecturers may have focused more on making content available online, creating lecture recordings and narrating lecture slides than actively seeking ways to attract and sustain students' attention. According to Hodges et al. (2020), developing and preparing a good quality online course takes approximately six to nine months. Ackermann (2021), an accounting lecturer, accurately describes these feelings during the initial stages of the lockdown when the reality of the change and resulting stress became apparent: "I had, like most of us, one week to figure out how to transition to online learning. How will I do this? How will I teach?".

Further support for possible reasons for the low score for attention comes from the DIPEM survey, which revealed that the biggest practical challenge that the COVID-19 pandemic had on students' learning experience during 2020 was the lack of a quiet place to study. More than 25% of the respondents indicated that their learning environment during the lockdown was not conducive to learning (DIPEM, 2020). Keller (2009) suggests that too many distracting stimuli in the environment may prohibit students' ability to pay attention. It is thus plausible that the learning environment students found themselves in as a result of the 2020 lockdown contributed to our sample's apparent low score on attention as a subscale of motivation.

The 2020 Annual Report of Universities South Africa (USAF) points out that considering a hybrid model of delivery in higher education, where face-to-face instruction is supplemented with online instruction, is likely to become "a vital shift in our thinking" (USAF, 2020, p. 9). Marinoni, Land and Jensen (2020) report that while many educators around the globe felt challenged to make the unprepared shift to online teaching and learning, much capacity building in terms of knowledge, tools and systems for facilitating distance learning has since taken place.

The final part of the analysis entailed using multiple logistic regression to explore how and if the four domains of the ARCS model (the independent variables) were associated with the level of motivation as expressed by the participants (the dependent variable). Our dependent variable, students' self-rated level of motivation, was derived from question 25 on the questionnaire where students were required to rate their overall motivation for attending and studying the online tax module during 2020. Students could select one of the options provided, namely: not motivated; slightly motivated; motivated some of the time; motivated most of the time; and motivated during the entire course. The results of the multiple regression model show $R^2 = .388$ and Adjusted $R^2 = .356$. These are low, however, the four variables statistically and significantly predict students' overall motivation, as the model reached statistical significance with $p < .005$ (see Table 2).

The results from the Pearson correlation displayed in Table 1 show that satisfaction, relevance and confidence have a medium to strong association with students' self-rated motivation (r is between .4 to .6), while attention only shows a small association ($r = .001$). The correlations between the independent variables are not too high (all below .7) and therefore all variables were retained in the regression model. Table 2 and Table 3 below show that the total variance in motivation explained by the four variables is 35.6%; $F_{(4,77)}$

= 12.204; the model reached statistical significance with $p < .001$.

Table 1   Correlations

		Self-rated motivation	Satisfaction	Relevance	Confidence	Attention
Pearson Correlation	Students' self-rated motivation	1.000				
	Satisfaction	.580	1.000			
	Relevance	.409	.411	1.000		
	Confidence	.480	.624	.482	1.000	
	Attention	.001	.089	.090	.217	1.000
Sig. (1-tailed)	B	.				
	Satisfaction	.000	.			
	Relevance	.000	.000	.		
	Confidence	.000	.000	.000	.	
	Attention	.497	.214	.212	.025	.

Table 2   Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.623	.388	.356	.899

Table 3   ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.424	4	9.856	12.204	.000
	Residual	62.186	77	.808		
	Total	101.610	81			

To evaluate the contribution made by each of the variables in predicting students' motivation, and to identify which factor had the biggest impact, the standardised coefficients in Table 4 provide the answers.

From Table 4 below, it can be seen that satisfaction makes the strongest unique contribution to explaining the participants' motivation (Beta = .422), followed by relevance and confidence, with attention making a much smaller contribution.

Satisfaction is also the only variable that makes a statistically significant contribution ($p <$ .001), while the other three variables do not appear to make a unique statistically significant contribution to predicting student motivation in the online tax module. Palmer and Holt (2009) recognise that student satisfaction with online learning is "a complex and multidimensional construct that includes a wide range of factors". In our study, satisfaction was measured mainly from students' perceptions about the level of challenge in online activities, instructor feedback and ease of use of the online platforms. Although we did not investigate

these elements independently, our results show consistency with that of Palmer and Holt (2009) who found that student perceptions of "how well they thought they were performing in the unit" was one of the elements that significantly contributed to student satisfaction with an online module. Palmer and Holt (2009, p. 110) conclude that students studying online "were most concerned about the same things that would concern any student – what they need to know/do to get a good mark/grade and receiving useful feedback on their assignment work".

Table 4   Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.093	.893		.104	.918
	Satisfaction	.474	.130	**.422**	3.646	**.000**
	Relevance	.322	.196	**.170**	1.645	.104
	Confidence	.265	.212	**.154**	1.252	.214
	Attention	-.160	.172	**-.085**	-.930	.355

The fact that the other three domains (relevance, confidence and attention) did not appear to contribute significantly to this sample of students' overall motivation, does not mean that they are not important. Our sample may introduce bias in our regression model because the sample may not be representative of all possible outcomes (we assume that students who found the course enjoyable and beneficial would be the ones willing to complete the survey).

Concluding remarks

The study set out to detect the motivational problems of a group of final-year undergraduate tax students based on the ARCS model of motivation. It further aimed to find which motivational element displays the strongest association with students' overall motivation to engage with online learning

activities. Given the fact that online learning may become part of what many universities consider to be a 'hybrid learning model' going forward in the aftermath of the pandemic, it appears that online learning will become a permanent feature of teaching and learning. Our findings may therefore provide insight into students' motivation to engage with online learning activities.

Our results showed that **relevance** was the domain of motivation that rated highest on the CIS, confirming that this sample of students consider the learning content and activities as relevant to their personal goals. This is meaningful for a course such as taxation which has a strong vocational orientation, and educators could build on this by ensuring that learning content reflects real-world and career expectations. **Confidence**, **satisfaction** and **attention** scored considerably lower, which

means that students' motivational problems lay in these domains. We postulated that low confidence may be ascribed to the situation brought about by the unpreparedness of students due to the sudden move to online learning (lack of connectivity and suitable devices, and lack of skill in engaging with online platforms) as well as fear of the unknown. Results for satisfaction as a domain of motivation showed a higher mean for items on the questionnaire pertaining to intrinsic motivation than extrinsic motivation. We consider this a positive outcome and an indicator that students generally enjoyed the course. Results of the regression analysis showed that satisfaction as a domain of motivation makes the strongest unique contribution to explaining student motivation. This result implies that educators should recognise the importance of feedback and mutual communication between lecturers and students to enable students to feel that they have accomplished a task and overcame a challenge. Ultimately, it is an indication that students enjoyed the learning experience.

In conclusion, we concur with Hartnett, St George and Dron (2011, p. 33) that "motivation is not a one-dimensional trait, but is complex, multifaceted, and influenced by both person and context". Further, we acknowledge Suzuki and Keller's (2004, p. 237) declaration that educators and online learning tools and activities only influence learner motivation and do not control it. Therefore, "systematic motivational design can be effective when used properly and within the boundaries of modifiable influences on learners". In teaching a subject in an online environment, educators can assume that students do not necessarily have unique motivational challenges because of the course content. However, it may be worthwhile to pay special attention to the relevance of the subject in students' everyday lives and future career goals, as it appears that it may be an important factor in keeping students motivated. We suggest that the online learning environment provide unique opportunities for the educator to make a subject relevant to students' goals.

Suggestions for Further Research

Because we attributed some of the students' motivational problems to the unpreparedness of students and lecturers in moving involuntarily to an online environment, a comparative study with a group that is voluntarily learning in an online environment may be of value. Investigating the motivational problems and comparing it between the two groups may give a good indication of where more improvement is still needed and where new strategies employed by lecturers may have made a difference in student motivation.

Limitations

The limitations to this study are:

1) only a small sample of students completed the survey, and

2) only one university and one undergraduate qualification were included in the survey.

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