

Inspiring innovation to foster life-long learning through e-tivities

U S Premarathne¹, S Rajasingham¹, Buddhini G. Jayatilleke¹

¹ The Open University of Sri Lanka

uspre@ou.ac.lk; sraja@ou.ac.lk; bgjay@ou.ac.lk

Abstract - This case study analyses the significance of designing learning activities through the Keller's model of motivation. The learning activities included in this case study are of three types; pre-assignment, interactive and chat e-tivities. The main objective in designing the learning e-tivity is to create a suitable motivational strategy to motivate large number of learners, build learning communities and to foster life-long learning practices. The pre-assignment was designed for the learners to familiarize themselves with the learning management system and to portray themselves through an image relating to their personality. Interactive e-tivity was designed to give an opportunity to share their goals, motives and experiences among their peers relating it to each of the learners' perspective. Chat e-tivities were designed to observe the learner's attitude with respect to the intention of continuing the e-tivity subsequent to the session. The online feedback survey was conducted with the registered students (n=1898) following the first year undergraduate programmes from the Faculty of Engineering Technology, The Open University of Sri Lanka. The results show that the response rate was 63%, the completion rate of the pre-assignment which evaluated the attention and confidence was 59%, the average interactive e-tivity which evaluated the relevance was 70% and the chat e-tivity participation which demonstrated the influence for life-long learning was 70%. In addition, the appeal of the students with respect to the motivational strategies was based on the student feedback. In order to test the intention of whether or not they would continuously participate in learning activities after the completion of the module, a game based interactive puzzle was posted in the LMS and the participation rate was 55%, which evidenced the change of attitude towards life-long learning.

Keywords: e-tivities, Keller's model, life-long learning

INTRODUCTION

Motivation is important for a learner to help retain in the learning process. It is a driving force that helps the learners to sustain a positive attitude to continue and complete the learning e-tivities in the learning process. On the contrary, an unmotivated learner may have reluctance to continue and participate actively in learning (Alcivar et al., 2020; Takase et al., 2019). Motivational sources can be broadly classified as internal or self-developed and external (Huit, 2001; Kleinginna, P. R., & Kleinginna, A. M., 1981; Zimmerman, 2011). The internal or self developed motivational sources include perceived competence, perceived autonomy, inquisitiveness and goal orientation (Hassandra et al., 2003). The external motivational sources include inclusive learning environment, learning conditions, engaging content and learning activities, peer-interactions, mentoring, etc. (Dhingra et al., 2021, Machumu, 2018). These external factors can in turn develop or initiate self-development as a result of changes in their attitude. As evidenced (Yelon, 1992), motivation can be viewed as a set of principles. Such principles can be incorporated into instructions of the teaching and learning process. Instructions designed based on such principles help to improve the quality of learning (e.g. improves retention in memory through content organizing and rehearsing over time).

ARCS Model of motivational design was originally designed by John Keller (1987) for improving the learning process with motivation. In this model motivation is "the result of satisfaction of personal needs (the value) and also the amount of their expectancy to be succeeded" (Keller & Kopp, 1987). According to Keller (1987) it is a method for improving the motivational appeal of instructional materials. Keller defines motivation as "what people desire to do, what they choose to do, and what they commit to do" (Keller, 2010). This model has four conceptual categories and it incorporates a systematic design process called motivational design (Keller, 1987). The four main areas of this model are Attention, Relevance, Confidence, and Satisfaction. These four areas have subcategories to further define the specific aspects of motivation. The acronym ARCS results from the first letters of the four aspects in order of ARCS. Attention is one of the most important parts of this model. It raises the motivation for learners by capturing the interests of the learners and continuing to retain their interests throughout the learning process. Relevance relates to interests that result from considering a student's experiences and needs (Keller, 2006). The experiences and the

needs relates to the familiarity or the background of the learner. For example, to explain a particular concept you may quote an example from a specific cultural, geographical or religious background. Then, the students may find an immediate connection to that example and better understand the concept. Confidence refers to the establishment of positive expectations to successfully achieve the intended success (Keller, 2006). For example, confidence to complete an assignment could be gained by reading the relevant material and using the video lectures for the learning process of the specific topics. Satisfaction means the reward or the state of mind which establishes a sense of accomplishment from a learning experience (Keller, 2006). For example, once a student submits the answers to an assignment and after evaluation, if he gets a good mark, the learner will be satisfied. The level of the mark indicates his performance. The learner appreciates the performance indicator. It is important to note that the ARCS model is a framework which helps the lecturers to design the instructions to ensure that the motivation is inculcated in the learners throughout the learning process (Shellnut, 1999; Wongwivatthanakit & Popovich, 2000; Zhang, 2017). However, this model does not guarantee that the motivation level of a learner will be increased due a change in behaviour as some studies show no reported gain with respect to using the ARCS model (Li & Keller, 2018). ARCS model is a flexible and easily adaptable model which can help the teachers and the learners to have a better experience in the teaching-learning process (McKivigan, 2019). In addition, this model does not dictate the motivational strategies. It is advisable to test the suitability of certain motivational strategies using small groups prior to implementing it to a much larger group. Trial-and-error technique can be used to test and identify the most suitable motivational strategy considering the type of course, content and the background of the learners.

In this study the activities are created to promote the suitable motivational strategy and the appeal was determined based on the student feedback. Activities were created and made available using the Learn OUSL Learning Management System (LMS). The activities were open to access from December 01, 2021 until April 01, 2022. Student feedback was recorded using Google Forms. The student interactions were recorded for each activity in the LMS. Activity logs were used for the analyses. Based on the results, it is evident that student interactions increased over time even after the formative assessments of the course module was complete. The main motivation for the students was the need to contact and communicate with their peers and to participate in interactive challenge driven activities.

USE OF THE ARCS MODEL IN INSTRUCTIONAL DESIGN

The ARCS model describes the motivation to learn based on four categories consisting of general process questions and motivational strategies to apply for instructional design. Four (04) main steps in the process of using the ARCS model is described as follows:

STEP1 - Includes a student analysis to identify the motivational objectives to develop a motivational profile. By conducting the student analysis it helps to identify the entry level motivational objectives. Also, by conducting the student analysis, the gaps in these initial motivational objectives can be identified. For an example, at this initial student analysis, a course coordinator would be interested to know why a student has selected to follow a particular course. Benefits of conducting this student analysis helps the course coordinator to understand and confirm the judgment(s) based on the previous experiences in teaching the same course with students with similar knowledge background. A judgment on the initial motivation can be affirmed based on the feedback from a teacher who taught the same course earlier or by interviewing a set of students (e.g. focus group interviews). Based on the information gathered, it can be determined whether the students will be below, at, or above the appropriate level in each motivational category considering the pre-requisites and the learning outcomes of the course. It is important to know this initial motivational level to avoid any misjudgement as an overestimation or an under-estimation.

STEP2 - Based on the motivational profiles, suitable motivational objectives are identified and the corresponding measures are designed. It is possible to write the motivational objectives considering the student perspective. However, these motivational objectives must be specified as expected considering the four categories of the ARCS model. The motivational objectives can be cognitive, affective, or psychomotor skills. The techniques used in evaluating the strategies can be based on the direct observations, interviews, and self-reported questionnaires. For

example, self-reported questionnaires can help the course coordinator to identify the confidence level (e.g. satisfactory, low, moderate) of a student based on their own assessment.

STEP3 - Integration of the designed motivational strategy for each motivational objective into the instructions. For example, question based openings, open discussion to develop a concept, views on an open issue to arrive at a specific topic, etc. can be used as motivational strategies to enhance the confidence in students and to engage them in e-tivities. Selection of the appropriate strategies could be a trial-and-error method, effectiveness of the strategies can largely depend on the nature of the lecturer or the course coordinator. However, it is noteworthy that these strategies: (i) should not take up too much time; (ii) should not detract from the learning objectives; (iii) should fall within the time and money constraints of the development and implementation phases of the instruction; (iv) should be acceptable to the students; and (v) should be compatible with the instructional methodology, including the educator's style.

STEP4: Implementation of motivational strategies. Potential mechanisms to implement pilot runs, small group based try-outs to determine the appeal of each strategy considering the perspectives of the students. This step is useful to understand the effectiveness of suggested strategies. If the intended results are not produced, then, it is possible to revise or replace with new strategies to better suit the learners and the e-tivities.

DESIGN AND DEVELOPMENT

The course module that was selected was a part of the introductory programme for the new students. Main objective of the modules is to introduce the related concepts and make them aware of the open and distance learning (ODL) environment. Different modules are designed to encourage peer-interactions, academic writing, collaborative and independent learning concepts etc. Online assessments were conducted to assess the intended objectives. This was the first time this course was delivered online. Prior to the pandemic, it was conducted on an on-campus face-to-face delivery mode. Teachers and the learners were physically present at a lecture room and the modules were conducted by the teachers and there were no online assessments involved in each module.

Planning the learning e-tivities based on a five (05) stage scaffolding learning model by (Salmon 2000, 2004) for an online learning module: (i) access and motivation, (ii) online socialization, (iii) information exchange, (iv) knowledge construction and (v) development. This model was selected primarily due to the equivalence concept in achieving the intended module learning outcomes. With the concept of equivalence, learning e-tivities were designed to provide experiences that are of equal value regardless of the mode of delivery. Another important aspect for selecting this model is its use for a more interactive course module. Therefore, the e-tivity is designed with the following approach: (a) stimulus for learner engagement, (b) individual participation to spot a contribution, (c) Interactive participating event for peer interactions, (d) feedback from a moderator, (e) instructions made available online. Design using ARCS approach for instructional design can be aligned with the above stated five(05) stage model where motivation is gradually built in learners by progressing through stages 1, 2, and 3.

TABLE 1

Motivational Strategies and Proposed E-tivities

Scaffolding Model Stages	Proposed e-tivity	Motivational Strategy
Attention	(i) Moodle class setup (ii) Individual e-tivity prior to live online sessions (iii) Schedule online interactive sessions	(i) Email notification to access the Moodle class

	<ul style="list-style-type: none"> (iv) In-class online individual e-tivity (v) In-class online group e-tivity (vi) In-class discussions (vii) Asynchronous communications (viii) Survey online feedback forms 	<ul style="list-style-type: none"> (ii) Email notification about the individual e-tivity and submission through Moodle dropbox, reminder email notifications (iii) Email notifications and Moodle class announcements with details of the Zoom meeting links, dates, times to join (iv) Resource person communicate on synchronous Zoom meeting (v) Group in breakout rooms in Zoom meeting (vi) Resource person and peers communicate on synchronous Zoom meeting (vii) Message and chat messages via Moodle class (viii) Email notifications with the links to access the feedback forms
Relevance	<ul style="list-style-type: none"> (i) Learning/Course module outcome (ii) e-tivities conducted in English language (iii) Online platform based delivery (iv) Accommodating the student availability [e-tivities for both in-class and off-class] 	<ul style="list-style-type: none"> (i) Announcement in Moodle class (ii) Encourage to communicate (verbal and written) as the same language in which the degree programme will be conducted (iii) Commonly used online tools and communication platforms used, Moodle class based communications are initiated to familiarize the students to the Moodle environment (iv) Scheduling online sessions during week-ends by considering the requests from the employed students
Confidence	<ul style="list-style-type: none"> (i) Multiple e-tivities (ii) Individual and group e-tivities (iii) Oral and written e-tivities (iv) ICT tools (e.g. Moodle Chat) for online interactions and e-tivities 	<ul style="list-style-type: none"> (i) Allowed to attempt and complete more than one e-tivity (ii) Enhance the communication with the lecturers as well as their peers (iii) Flexibility in participating based on the learner preferences (iv) Enhance self-efficacy in using the features in ICT tools for online course related activities
Satisfaction	<ul style="list-style-type: none"> (i) Feedback on submissions (ii) Discussions 	<ul style="list-style-type: none"> (i) Written feedback encourage to share views, suggestions, comments etc (ii) Verbal feedback encourage to share views, suggestions, comments etc

The motivational design based on the ARCS model includes a systematic design process: define, design, develop and evaluate. These four phases allow us to propose, select, implement and evaluate based on the e-tivities. The three stages are described as follows: define, design, develop and evaluation of the motivational strategies.

- Define - This phase corresponds to STEP1. Classify the motivational strategies and the corresponding e-tivities with suitable evaluations and performance indicators. The proposed motivational strategies and the corresponding e-tivities are described in Table 1.

- Design - This phase corresponds to STEP2. The design phase starts with a list of potential motivational strategies for each of the objectives. At this point, it is generally best to use a brainstorming approach to create a broad range of strategy ideas. The goal is to move away from the analytical thinking that characterizes the define phase, and to begin thinking in an uncritical, more creative mode. By creating a variety of possible strategies the likelihood of finding optimal strategies is increased. The next step is to critically review the potential strategies, and select the ones to be used. Five guidelines that help accomplish the motivational strategies includes the following:
 - (a) not take up too much instructional time,
 - (b) not detract from the instructional objectives,
 - (c) fall within the time and money constraints of the development and implementation aspects of the instruction,
 - (d) be acceptable to the audience, and
 - (e) be compatible with the delivery system, including the instructor's personal style and preferences.

All of the above considerations show that the main concern for motivation as a means to sustain along the process. For example, consider when the students join a class of a compulsory course. The attitude to follow the course and the motivation to complete the course successfully may be primarily due to the fact that it is a compulsory course within the prescribed credit limit. Large amounts of motivational strategies would add more complexity to teach such a course. Rather, it would be more beneficial to support the student to retain his motivation through the learning process by designing the e-tivities to create enthusiasm. As evidenced in [Brophy1983], motivational strategies should stimulate the motivation to learn and not detract from the learning process.

- Develop - This phase corresponds to STEP3. During the development phase relevant e-tivities and suitable material are designed and developed (e.g. video, slides, interactive games) and integrated into the instructions. The development phase usually requires revision of the instructional materials to ensure continuity and internal consistency. Since it was the first time that the selected course module of the orientation programme was conducted entirely using online platforms, there was no existing instructional material available to suit the online delivery.
- Evaluate - This phase corresponds to STEP4. It is important to conduct the evaluation of the submissions for each e-tivity based on motivational as well as learning outcomes. Often the decisions made regarding the effectiveness of the proposed motivational strategies are based on marks or other achievement measures. It is recommended in (Keller, 2006), to use direct measures of effort, emotion, and attitude where appropriate to measure the effectiveness of a motivational strategy.

The focus group is first year undergraduates. The total number of participants (n= 1898) are from three undergraduate degree programmes. A total of 966 learners participated in the first and the second feedback sessions. The feedback forms were created using Google forms. A common suggestion given in the first feedback form was to include interactive e-tivities. Considering this feedback, a web-based game was developed and integrated to the LMS. This was a strategic game with moderate difficulty. The main objective for providing the game based interactive puzzle was to test the intention of whether or not the students would participate in the learning e-tivities that were provided even after the completion of the course module and also to check if the designed learning e-tivities did trigger the attitude towards life-long learning.

RESULTS AND DISCUSSION

Fig1 shows that 89.6% students are in the category, 20-30 years and 9.1% are in 30 – 40 years.

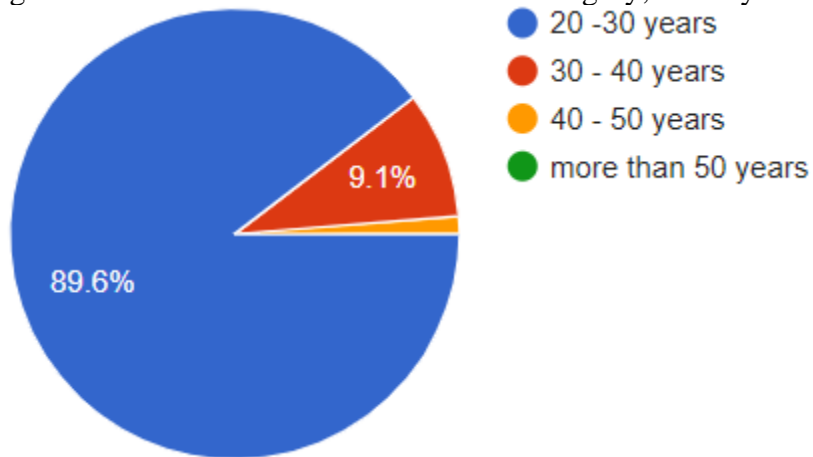


Fig1: Age distribution of the students

Fig 2 shows that approximately 94% of the students were satisfied with the e-tivities and only 1.8% were not satisfied at all with the e-tivities.

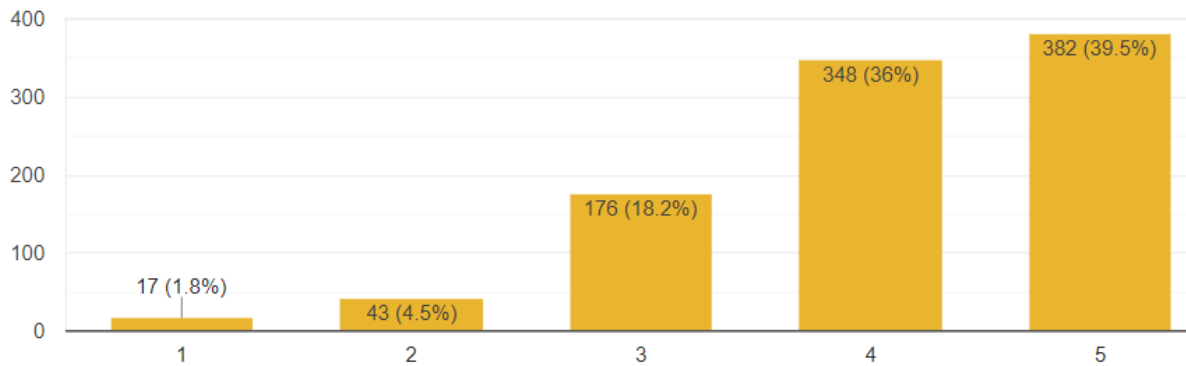


Fig2: Overall student satisfaction (Lickert scale, 1- not satisfied, 2 - fair, 3 - satisfied, 4 - highly satisfied, 5 - very much satisfied)

Fig3 shows that 93% of students have had minimum to no difficulty in using the online e-tivities.

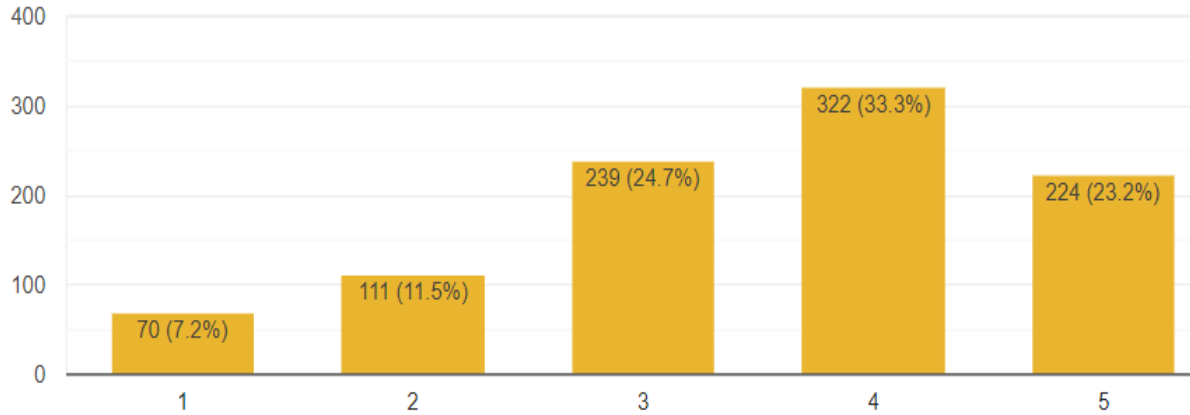


Fig3: Overall ease of access and use of online e-tivities (Likert scale 1 - difficult to use and access, 2 - too easy to use and access, 3 - fairly easy to use and access, 4 - comfortable to use and access, 5 - very easy to use and access)

Fig4 shows that most of the students are equally satisfied with the e-tivities and most of the students lean towards the satisfied category.

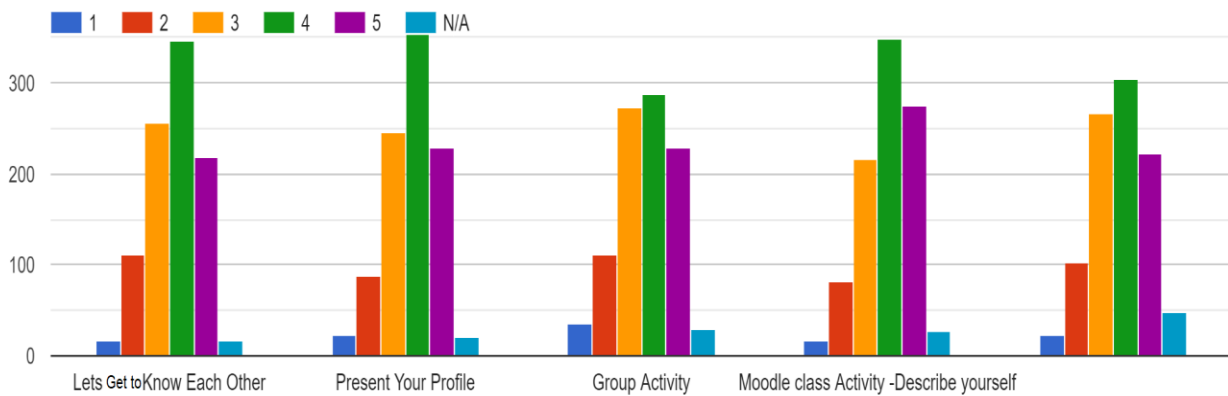


Fig4: Overall satisfaction in participation in e-tivities (Lickert scale, 1 - not satisfied, 2 - fair, 3 - satisfied, 4 - highly satisfied, 5 - very much satisfied)

Fig5 indicates that most of the resource persons resorted to using most of the features available for the student interactions.

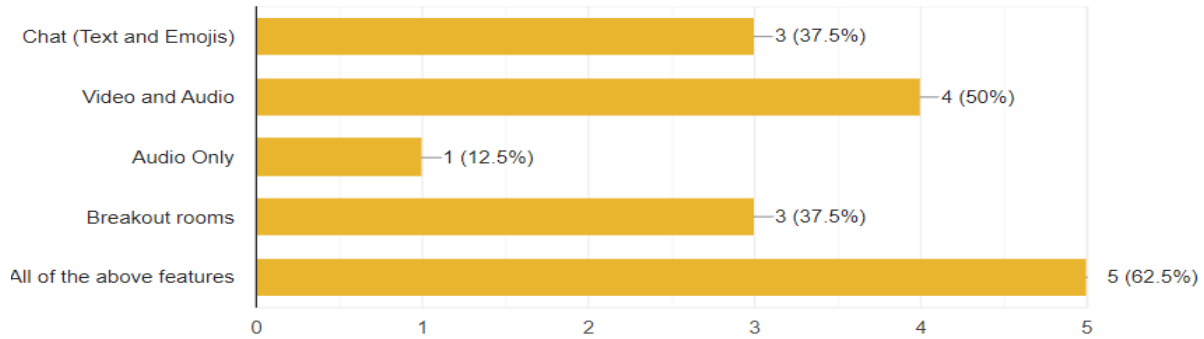


Fig5: Feedback from resource persons - Features used for student interactions during online sessions

Fig6 shows the tool used for interactions within the breakout rooms were mostly audio (microphone) 62.5% and approximately 25% used video and audio as well and the rest were communicating via chat.

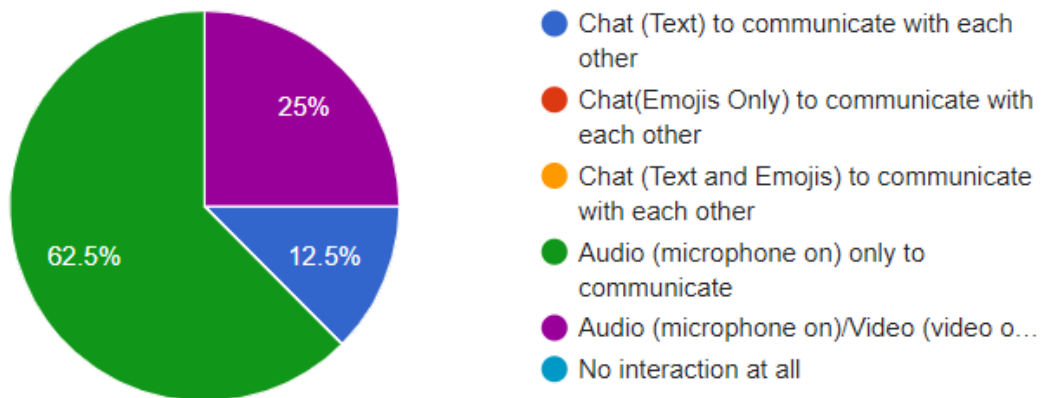


Fig6: Feedback from resource persons - Interactions within the breakout rooms

Fig7 shows the participation of the students for the respective e-tivity. It indicates that the e-tivity “Let’s Get to Know Each Other” and “Present your profile” had a higher participation than that of the group e-tivity.

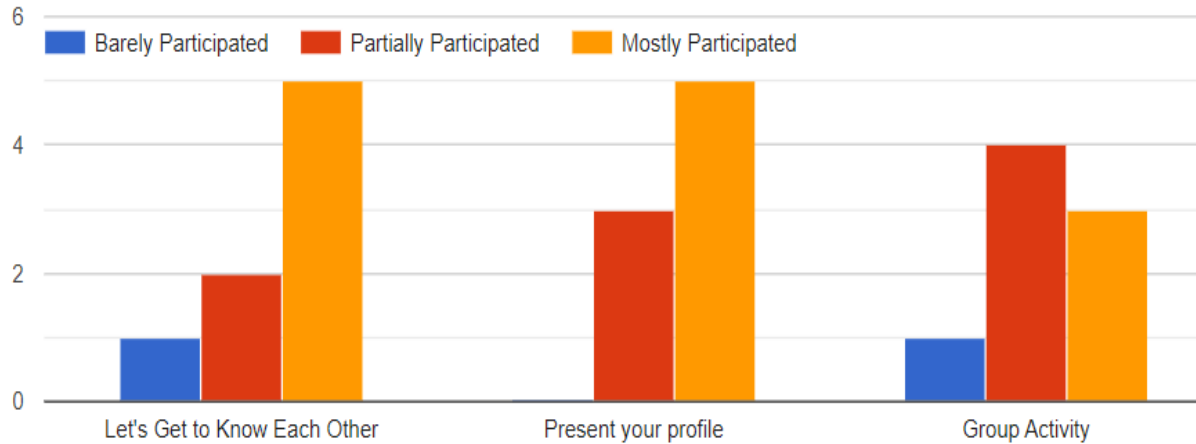


Fig7: Feedback from resource persons - Participation in e-tivities during online sessions

Fig 8 shows the overall experience of the resource persons which indicates an overall positive outcome.

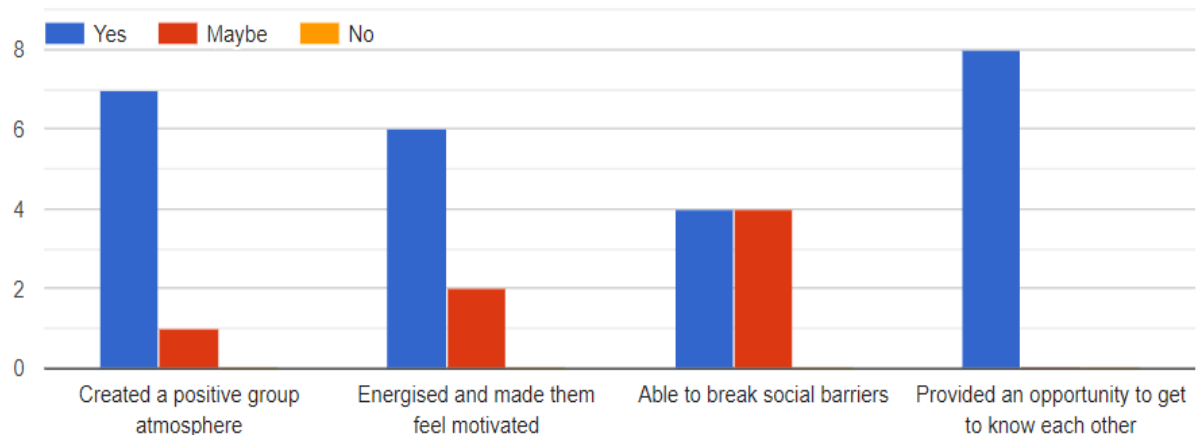


Fig8: Overall outcome of the delivery of the module from the resource persons

Box 1 shows the comments and suggestions from the resource persons for future learning e-tivities.

Box1

Comments and Suggestions from the Feedback of the Resource Persons

- “Instead of the e-tivities, at the end of the session we asked live comments from the students about the session. The comments were commendable and saw that they were really satisfied about the session in terms of active participation and waive out their fear of public participation and language barriers.”
- “Well organized”
- “The session was well arranged with proper e-tivities for the Ice breaker”
- “There were enough time allocation for each e-tivity”
- “grouping to small student count groups may focus students more.”
- “Well organized session”
- “Well organized and clear instructions given for us to conduct the session.”

CONCLUSION

Motivation is important for a learner to help retain in the learning process. It is a driving force that helps the learners to sustain a positive attitude to continue and complete the learning activities in the learning process. The motivational design based on the ARCS model includes a systematic design process: define, design, develop and evaluate. This study shows that there is a significant impact in the students' performance level and interest by including the Keller's ARCS model of motivation in the learning activities and that emphasizing on the respective factors did influence the students' motivational factors regardless of the group size, helped students build learning communities during the process and trigger the attitude towards life-long learning. It also shows that the overall experience was positive for both the students and resource persons.

REFERENCES

- Alcivar, C. M. M., Quimi, T. L. I., & Barberan, M. F. Z. (2020). The motivation and its importance in the teaching-learning process. *International Research Journal of Management, IT and Social Sciences*, 7(1), 138-144.
- Dhingra, S., Pasricha, N., Sthapak, E., & Bhatnagar, R. (2021). Assessing the role of internal motivation and extrinsic factors on online undergraduate medical teaching in a resource-poor setting during Covid-19 pandemic in North India: an observational study. *Advances in Medical Education and Practice*, 12, 817.
- Hassandra, M., Goudas, M., & Chroni, S. (2003). Examining factors associated with intrinsic motivation in physical education: a qualitative approach. *Psychology of sport and exercise*, 4(3), 211-223.
- Huitt, W. (2001). Motivation to learn: An overview. *Educational psychology interactive*, 12(3), 29-36.
- Keller, J. M. (1987). Development and use of the ARCS model of instructional design. *Journal of instructional development*, 10(3), 2-10.
- Keller, J. M. (2006). Part I. development of a concept inventory addressing students' beliefs and reasoning difficulties regarding the greenhouse effect, part II. distribution of chlorine measured by the mars odyssey gamma ray spectrometer. The University of Arizona.
- Keller, J. M. (2010). The Arcs model of motivational design. In *Motivational design for learning and performance* (pp. 43-74). Springer, Boston, MA.
- Keller, J. M., & Kopp, T. (1987). Application of the ARCS model of motivational design. In C. M. Reigeluth (Ed.), *Instructional theories in action: Lessons illustrating selected theories and models*. Hillsdale, NJ: Lawrence Erlbaum, Publisher.
- Kleinginna, P. R., & Kleinginna, A. M. (1981). A categorized list of motivation definitions, with a suggestion for a consensual definition. *Motivation and emotion*, 5(3), 263-291.
- Li, K., & Keller, J. M. (2018). Use of the ARCS model in education: A literature review. *Computers & Education*, 122, 54-62.
- Machumu, H. J. (2018). *Constructivist-based blended learning environments in higher education: student and teacher variables in the Tanzanian context* (Doctoral dissertation, Vrije Universiteit Brussel).
- McKivigan, J. (2019). Keller's ARCS Model and Gagne's Nine Events of Instruction. *Journal of Educational Studies*, 5(1), 1-2.
- Salmon, G.K. (2000, 2004). *E-moderating: the key to teaching and learning online*. London and New York: Routledge Falmer

Shellnut, B., Knowlton, A., & Savage, T. (1999). Applying the ARCS model to the design and development of computer-based modules for manufacturing engineering courses. *Educational technology research and development*, 47(2), 100-110.

Takase, M., Niitani, M., Imai, T., & Okada, M. (2019). Students' perceptions of teaching factors that demotivate their learning in lectures and laboratory-based skills practice. *International journal of nursing sciences*, 6(4), 414-420.

Wongwiwatthanakit, S., & Popovich, N. G. (2000). Applying the ARCS model of motivational design to pharmaceutical education. *American Journal of Pharmaceutical Education*, 64(2), 188-196.

Yelon, S. (1992). MASS: A model for producing transfer. *Performance Improvement Quarterly*, 5(2), 13-23.

Zhang, W. (2017). Design a Civil Engineering Micro-lecture Platform based on the ARCS Model Perspective. *International journal of emerging technologies in learning*, 12(1).

Zimmerman, B. J. (2011). Motivational sources and outcomes of self-regulated learning and performance: Graduate center of city university of new york. In *Handbook of self-regulation of learning and performance* (pp. 63-78). Routledge.