Fun Teaching to Improve Learning Outcomes in Higher Education

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ABSTRACT

Objective(s): This study examines the role of fun tools and active learning environments against the backdrop of play in improving higher education outcomes. Specifically, the traditional teaching methods along with active-learning fun tools, have been evaluated.

Methodology: A mixed-methods approach was adopted, incorporating both qualitative and quantitative tools. The summative assessment includes student engagement surveys and pre- and post-learning gain tests.

Results: The results indicated that learning outcomes improve when traditional lecture and instructor-led teaching are supplemented with fun and technology-driven tools. Also, using fun as a vehicle to deliver content effectively via a structured five-step method was analysed. These strategies are based on adult learning principles, which propose fun tools for each of the four learning modalities along with strategies to overcome resistance to their usage.

Conclusion: Incorporating fun tools in higher education can improve cognitive development.

Keywords: fun; content; learners; active learning; technology

INTRODUCTION

Teaching refers to the design and development of activities to promote student learning outcomes (Smith, 1995). The primary goal of teaching is to maximise student learning (Hativa, 2000). Kapur (2020) highlighted that effective pedagogy is crucial for effective student learning to achieve learning outcomes. According to Peel (2024), pedagogy refers to the study of teaching methods.

Good teaching makes a difference, as well-taught students learn better than those who are not. Cross and Steadman (1993) identified the characteristics and methods of good university teaching. Good teaching is critical for effective learning (Ramsden, 1992). Abrami et al. (1997) commented that good teaching effects deep and meaningful student learning. Shulman and Hutchins (1997) remarked that although teaching is considered scholarly work, it should also be seen as a continuous inquiry and reflection process. Such a view would help teachers understand their students' expectations better and make student learning more effective. They also argued that the responsibility for the quality of teaching rests on teachers.

Successful teaching results in positive changes in cognitive, affective and psychomotor domains. Additionally, it improves learner retention and reduces learning time (Palaniappan, 1998). Successful and meaningful student learning can be defined by 14 principles postulated by the American Psychological Association (APA, 1997).

Two of the 14 principles indicate that learning is achieved through a continuous process in which students link new knowledge to their own experiences and the existing knowledge base. As suggested by APA principles 1 and 3, learning transference to new situations occurs when new knowledge is integrated with learners' prior knowledge and understanding. Students learn content both within and outside the classroom (Donald, 2000). However, since students spend only a limited time in the classroom, it is essential that teachers make the best use of this duration to promote learning inside the classroom and motivate them to continue learning outside as well (Hativa, 2000). Student learning includes several factors, such as student preparation, responsibility for learning, aptitudes for learning, studying approaches and preferences for teaching styles (Pace, 1988). The effective teacher accommodates all of these factors while teaching. Nevertheless, this study focuses on teachers' and not the students' efforts eventhough student voice is critical to improving the quality of student learning (Palaniappan, 1998).

One of the major challenges attributed was the inability of teachers to communicate their knowledge to students (File, 1984). This phenomenon could be attributed to most faculty members not receiving any formal, systematic pedagogical training to improve the teaching processes essential for enhanced learning outcomes (Hativa, 2000).

The constructivist learning theory (Narayan, 2013) implies that most learning is not effiective as the learners are passive. Only during active learning, can they construct their own understanding, i.e., they are able to modify their previous knowledge while using the content (Hativa, 2000). Meaningful learning occurs when students actively, interpret and link the new information to their existing knowledge. This approach requires the teachers to modify their teaching practices and move from teacher- to learner-centred methods (Palaniappan, 1998), implying a transference from a didactic to a participatory mode while teaching.

One method consistently used to promote learner-centred learning is the incorporation of games and play with learning. Several studies have linked the notion of play with learning (Vygotsky, 1978; Whitton, 2018; Tuddenham, 1966). The interrelationship between play and learning has been considered critical for healthy child development. Norgard et al. (2017) reported that the interrelation between play and learning is being explored in the context of higher education and intergenerational activities.

Fincham (2016) highlighted that fun is an effective pedagogical tool. Fun plays a vital role in shaping childhood experiences and learning, unlike in adult learning. Pike (2015) pointed out that the perception that the rules prescribed for fun learning do not apply to adults is not valid, as adults are still kids with big bodies. A widely accepted theory is that children learn effectively with fun and play. However, when dealing with adults, fun and play are viewed as disruptive and time-wasting. The use of games and play in learning has been generally disliked by faculty members on the assumption that they are time-consuming, deviating from the delivery of content and using irrelevant funny activities. Fun learning can be differentiated from funny and time-consuming activities if active learning is incorporated into delivering the content and linked to the learning objectives. Figure 1 highlights the differences between fun and funny activities.

FUN	FUNNY
Purposeful	Purposeless
Serious	Trivial and casual
Structured	Unstructured
Learning-oriented	Entertainment-driven
Means to end	End in itself
Integrated	Stand-alone

Figure 1: Fun versus Funny

Figure 2 highlights the new and old scenarios in learning, prompting a revision in teaching methods in higher education. Fun is a catalyst that allows learners to construct their own knowledge through active experiences and social interactions in the learning process (Palaniappan, 1998). The use of fun in teaching for effective learning in higher education prompts active participation and learning for students. It produces superior results in areas, such as comprehension, retention and application. Fun provides a safe environment for learners to think critically, ask questions and challenge different scenarios (Palaniappan, 1998). Figure 3 explains the high fun and content model.

New	Old
Self-directed learners	Mandated learners
Proactive learners	Reactive learners
Creative learners	Compliant learners
Active learners	Passive learners
Excited learners	Bored learners

Figure 2: New versus Old scenario

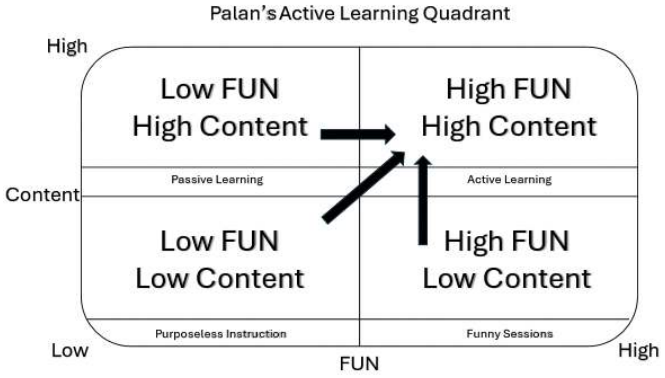

Figure 3: The Active Learning Quadrant

In my career as a teacher, I have used fun tools to consolidate adult learning. Fun and discovery can be deemed the core principles for learning. I used tools from *Games Trainers Play* (Newstrom & Scannel, 1980) to teach adults, but was criticised for lacking a theoretical foundation and guidance for teachers to choose these tools. However, the games suggested were proposed by practitioners. Later, when writing the book *The Magic of Making Training Fun* (Palaniappan, 1998), I found ways to relate the fun tools to learning theories.

Lauricella and Edmunds (2022) pointed out that Ludic pedagogy as a teaching philosophy emphasises fun and enjoyable experiences with academic rigour. The study also proposed four elements: fun, play, playfulness and positivity to create an active learning environment. The activities do not have to be extremely serious to enable learning (Thiagarajan, 2005). When the four elements are

integrated, the teachers can enhance the engagement, motivation and learning outcomes. Thus, fun promotes intrinsic motivation, leading to greater student involvement and interaction.

Learners are considered to be involved in the learning process when they perceive and acknowledge that they are learning something meaningful. Polya (1965) also cites Kant's dictum 'Learning begins with action and perception, proceeds from thence to words and concepts, and should end in desirable mental habits' (p.103).

Students involved in learning, thinking and doing something about their learning are considered active learners who have higher-order thinking skills that include analysis, synthesis and evaluation as described by Bloom's taxonomy of cognitive domain (Paul, 2010). Bonwell and Eison (1991) remarked that in active learning, there is excitement in the classroom as learners look forward to their learning. The critical element in teaching is motivating the students to think critically. Polya (1957) argued that the pleasure of successful learning comes from intense mental activity and adopting a critical thinking mode.

Critical thinking improves the way the learner addresses the subject, content or problem by skilfully taking charge of the structures within thinking. The Paul–Elder framework (Paul, 2010) proposes incorporating three components—reasoning, intellectual standards and traits—in daily teaching activities to involve the students in critical thinking.

This leads the students to remain focused and engaged with the content. Content is the required condition, while fun is a facilitative factor (Palaniappan, 1998). Figure 4 highlights the three components—the teacher, content and fun tools—with the learner at the centre stage, while Figure 5 highlights the fun process model.

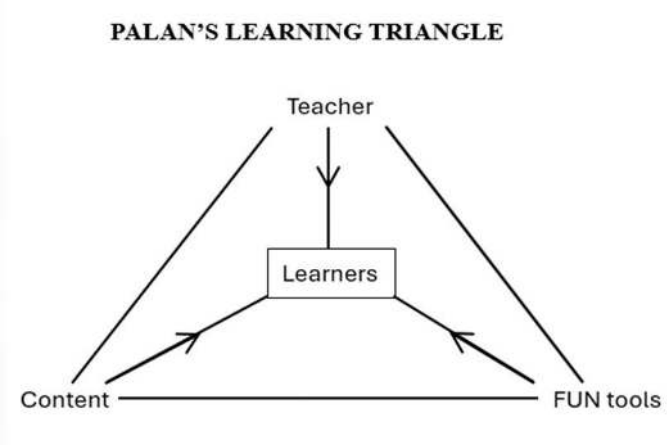

Figure 4: The Learning Triangle

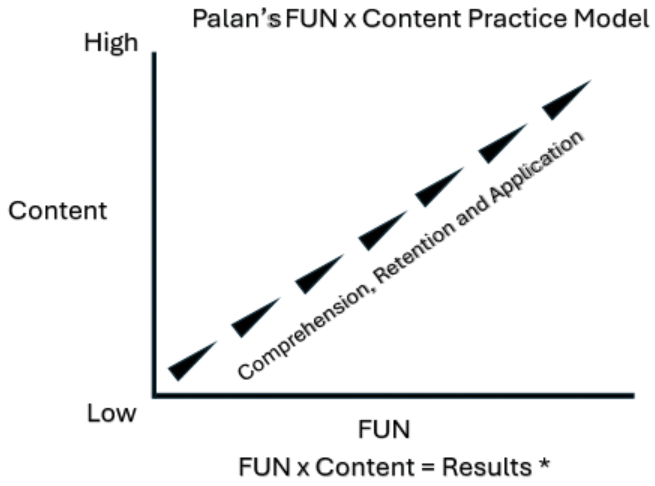

Figure 5: Fun versus Content Practice Model

Dewey (1944) remarked that if we teach today's students as we taught yesterday's, we rob them of tomorrow. The technology-led tools stimulate competition with games, generate safe learning environments and promote critical thinking among students, thereby improving learning outcomes (Palaniappan, 1998). Chee (2018) shared the Singapore approach to equipping teachers with technology that enhances communication and collaborative learning. The approach introduces a fun element and creates a competitive environment when the content is developed in a game format. In addition, technology assists teachers and reduces their preparation time. Also, students find technology-led games exciting.

For example, 'Legends of Alkhimia' is a game developed by Singapore's National Institute of Education (NIE) based on the national chemistry curriculum. The game enables students to learn through inquiry. Gamers learn chemistry through application in a virtual world. The level of involvement and interaction is exponentially higher (Chee, 2018).

Using fun tools leads to a fulfilling educational experience for both teachers and students. The present study investigated the impact of teaching in higher education when incorporated with fun tools and active learning environments compared to traditional teaching methods used to deliver content. The study also addressed the question of whether teaching with the use of fun and active learning tools improves learning outcomes in higher education.

The research is significant given the dissatisfaction with the teaching provided in the higher education sector (Hativa, 2000). Malaysia has developed an Education Blueprint for 2015–2025. Initial feedback indicates that the targets set to achieve the desired learning goals have not been met. Given that most of the literature in this area of investigation is from developed countries, the present

study will contribute to the knowledge of teaching methodologies and pedagogy amongst Asian countries.

METHODOLOGIES

My study used a mixed methods design as it facilitates collecting, analysing and mixing the quantitative and qualitative data during the research process to understand the problem (Cresswell, 2002; Tashakkori & Teddlie, 2003). Quantitative data were collected using a structured survey administered to 100 science stream students from five Asian countries: Malaysia, Indonesia, Singapore, United Arab Emirates and India. The survey is shown in Appendix 1. The survey included questions about their satisfaction with the use of fun tools and active learning environments compared to traditional teaching methods, such as lectures. The five-point scale response was structured to obtain feedback from very satisfied to very unsatisfied. The survey aimed to gauge learner satisfaction on five items: teacher preparation, delivery style, content understanding, learning variety and classroom collaboration.

Pre- and post-tests were used to measure learning gains. The test consisted of 20 multiple-choice questions (MCQ) on the content (Appendix 2). The survey data were analysed using descriptive statistics to summarise the data.

Qualitative data were collected using in-depth interviews conducted over 30 minutes with 10 students from among the survey respondents, five each from the control and experimental groups. The interview comprised 10 questions each. The faculty member who delivered the session was also interviewed. The interviews explored their experiences and learning outcomes with the new fun and active learning tools compared to traditional teaching methods such as lectures. Interview transcripts were analysed using thematic analysis. Informed consent was obtained from all participants before data collection, and they were assured of the confidentiality and anonymity of their responses.

The study's sample size was limited to science students from five Asian countries, which might affect the generalisability of the findings. Additionally, self-reported data on satisfaction might be subject to bias. This methodology is a robust framework that facilitates the investigation of the impact of fun tools and active learning environments on teaching students in higher education with the goal of improving learning outcomes. The mixed-methods approach is a comprehensive analysis, addressing both quantitative and qualitative aspects of the research question.

For the control group, the content was introduced through a didactic lecture method led by the teacher. On the other hand, the experimental group was introduced to similar content that was designed to include the five fun tools in an active learning mode with the teacher and the learners' participation. This comprised a structured model consisting of five steps: introduction of content, involvement of the learner, interactive learning environment, instructing learners and intensifying learner retention. The content included three learning domains—affective, behavioural-psychomotor and cognitive (ABC) domains— structured to appeal to all the learning modalities of the learners, such as visual, auditory, reading and writing and kinaesthetic (VARK). The goal was to ensure comprehension, application and retention (CAR). Both manual and technology-led tools were used in the session. Figure 6 highlights the five stages in the process of delivering content to achieve the learning objectives.

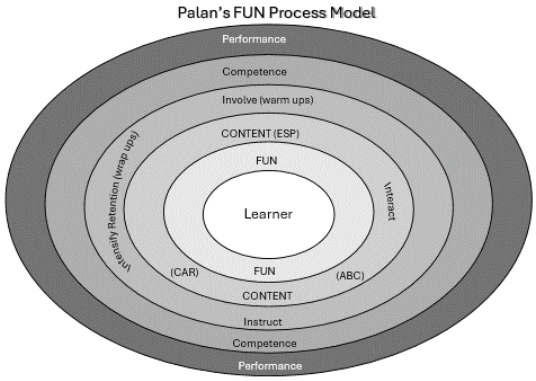

Figure 6: The FUN Process Model

The duration of the class for both groups was similar to the 2-hour class conducted in one sitting as per usual practice. The five fun tools used were crosswords, lecture games, guided discussions, preview-question-read-reflect-recite-review (PQ4R) discussions and mind maps.

Fun Tool One: Crosswords

Dixit and Sisale (2022) considered crosswords to be useful in creating an active learning environment. The purpose of the crossword at the beginning of the lecture was to introduce content, assess the entry-level knowledge of the class and inject an element of fun to make the learning environment active. During the lecture, crosswords were used in a game format to address the cognitive domain, while in the middle of the session, it was used as a formative assessment tool and at the end, as a summative assessment tool. The crossword was also used as a review, creating a safe environment for the students to try answering without fear. In order to promote safe environments, it was encouraged that the crosswords be completed in small groups rather than individually. A team-based environment created a fun and competitive atmosphere. The lecture was not passive, as students actively participated in completing the crossword. The games have numerous educational applications and are used in many domains, including science (Vandercruysse et al., 2012).

While it takes time to prepare the content for input into the crossword in a traditional way, software tools available today create and generate crosswords for any content minimising the teacher's preparation time. The design of the crossword was structured from easy-to-answer items to difficult ones to enable students to use their higher-order thinking skills. The words representing the content input into the crossword comprised the lecture later.

Fun Tool Two: Lecture Game

An interactive lecture game induces competition and greater learner involvement. Wu et al. (2011) considered the lectures as mostly passive, using PowerPoint slides in a one-way communication lecture. In a typical lecture, the teacher talks about a subject and students listen passively in a one-way communication, leaving little room for interactive or an active learning environment. Learners found this experience sedentary (Palaniappan, 1998). Cornish et al. (2000) reported that adults can only sustain an attention span of 20 minutes. Attention span refers to the time a student can concentrate on the task at hand without being distracted. Adults are prone to losing attention because of multiple distractions in the environment. This is defined as a shift of attention away from the primary task, such as listening in a lecture, towards internal information, such as memories (Smallwood & Schooler, 2006). Thus, it can be derived that attention span is fundamental for cognitive development in both adults and children.

Pike (2015) recommended that a 90/20/8 rule be followed for involving the learner, maximising learner interaction and retention and structuring the instructional session. Content can be taught for 90 minutes, but it must be chunked into 20-minute segments, and for every 8 minutes, there should be some form of interaction. In teaching basic chemistry to the control group and experimental group, the content delivered was similar, but the instructional strategy differed for the experimental group.

Following the guidelines, the students in the experimental group received a mini-lecture for no more than 20 minutes, followed by a game-format formative assessment, wherein the two groups were asked questions, and the correct answers gained points. The rationale for this instructional strategy was that the tasks required maximum cognitive control, minimising the loss of attention due to the involvement and interactivity. The competition introduced a fun element and an active learning environment. This was in line with a previous study that stated that interactive lectures promote greater comprehension and retention (Thiagi, 2005).

Fun Tool Three: Guided Discussions

The discussion method offers numerous opportunities for information exchange between the teacher and the student. It is open-ended, promotes interactivity and collaboration and enhances comprehension, thinking, learning and problem-solving among students (Wilkinson, 2009). This can be termed an instructional conversation (Nater & Gallimore, 1988), wherein the key tool is the question that prompts discussion on a text, problem or issue (Palaniappan, 1998). Questions are used to elicit students' thoughts and encourage critical thinking. The defining feature of guided discussion is a substantive conversation (Newmann, 1996). These conversations facilitate students' considerable agency in constructing their knowledge as well as understanding and interpreting the content. Discussions are student-led and occur in various formats, such as pairs, triads or small groups.

Knowles (1984) presented the principles of andragogy and argued that adults take responsibility for their learning when they understand its purpose. Using the discussion method within a lecture fosters greater student involvement and interaction compared to traditional lectures as the discussion method helps to relate the content to the purpose of learning.

Nevertheless, guided discussions have some limitations and require significant preparatory time for the teachers, especially since students are often new to the content. Herein, students in the experimental group were given prior reading material, unlike those in the control group.

Fun Tool Four: PQ4R Discussions

PQ4R is a study technique designed to manage technical content overload and facilitate understanding. Comprehension, retention and recalling of information can be challenging for many students; the PQ4R strategy aims to simplify this process (Thomas & Robinson, 1972). Incorporating PQ4R discussions in traditional lectures can improve concentration, comprehension and retention due to active learning.

Preview:

This step introduces the content to the students. All students receive reading material that provide an overview of the content. The preview session begins with questions to introduce the topic: 'What is the topic about?' and 'What will we cover in this class?' For example, in a class on photosynthesis, a visual of the process titled 'Factors of Photosynthesis' or an engaging question like 'How do plants feed?' might be presented.

Question:

Students are encouraged to frame questions based on the preview. Example questions might include inquiries about the process of photosynthesis, how it occurs or what is required for the synthesis.

The preview and questioning phases occur simultaneously, serving as a warm-up for class interaction and student involvement. This stage lasts a few minutes.

Read:
Students are then encouraged to read the provided handout material, considering the questions they have framed. Active reading after a lecture supports learning as students can relate to the material. This inquiry-based approach makes learning engaging and active.

Reflect:
Students are encouraged to reflect on their learning and post any questions on Post-it notes, which they stick on the classroom walls for information exchange with peers.

Recite:
At this stage, students hold a discussion, taking turns explaining the photosynthesis process. The class is divided into groups that take turns presenting the subject. A learning tournament is conducted to make it game-based, further strengthening active learning.

Review:
The review is led by the students using a puzzle to revisit the material learned during the class.

Fun Tool Five: Mind Maps
The mind map tool supports visual learning by organising data into a nonlinear format. It is considered an active learning strategy that facilitates learning process and helps the brain develop associations from a central concept (Buzan & Buzan, 1991). The method also assists students in making associations between concepts and enhancing retention.

Mind maps can be created manually or using technological tools. Since mind maps incorporate several learning strategies, such as mapping, outlining, imagery, mnemonics and acronyms, they capture learner attention and promote retention. The two primary scenarios are learner-driven and student-driven. Mitra et al. (2023) observed that while students used mind maps to understand science concepts and as revision tools, teachers used them as visual aids to structure the content and highlight the relationships between the concepts.

When integrated with a lecture, mind maps serve as a creative tool, presenting content visually. They help students structure their thoughts, and lecturers can present complex concepts in an organised manner, making interrelationships evident at a glance.

In the session with the experimental group, the teacher used mind maps as a supporting tool and encouraged students to prepare and share their own maps in small groups, resulting in interactive and self-directed learning.

RESULTS AND DISCUSSION
A group of 100 students from the Foundations in Science programme was randomly assigned to a control group and an experimental group, each consisting of 50 students. The same instructor presented similar content from the science stream to both groups.

The satisfaction survey aimed to elicit learner satisfaction on five items: teacher preparation, delivery style, content understanding, learning variety and classroom collaboration. Satisfaction in the experimental group was significantly higher compared to the control group. The results are in Appendix 3. Students in the experimental group reported enjoying the fun tools and the active learning environment, which helped them remain attentive to the content. They consistently indicated that the teacher was well-prepared and the content delivery was appropriate. Students expressed satisfaction with the learning variety and the active learning atmosphere. Approximately 95% of the students agreed that the tools were fun and interactive. In contrast, the control group indicated partial satisfaction with the traditional lecture method. They reported content overload and were neutral in their responses regarding teacher preparation and delivery style, despite assurances of anonymity and confidentiality.

The pre/post-test included 20 MCQs, structured from easy to difficult. A comparison of the pre- and post-test results between the groups is shown in Appendix 4. The average grade on the pre-test was 40% for both groups: highest 60% and lowest 20%. The majority of students did not answer at least one question on the pre-test, and no other significant patterns were noted in the pre-test.

For the control group, the average grade on the post-test was 50%, with the highest at 60% and the lowest at 30%, whereas for the experimental group, the average grade on the post-test was 90%, with the highest at 100% and lowest at 65%. As a class, the students in the experimental group showed a 50% improvement over the pre-test. The post-test learning gain of the experimental group significantly exceeded that of the control group. These findings suggested that the introduction of fun tools along with the lecture method was effective.

Interviews served as a complementary data analysis tool. A structured interview guide ensured consistency in conducting the interviews. The transcripts were analysed thematically. Appendices 4 and 5 highlight the themes (content, active learning and classroom collaboration) and keywords identified (clarity, ease, overload, fun, preparation, technology, interaction, involvement, responsiveness and time management) from the interviews.

Furthermore, interviews revealed that the teacher had to adopt new content delivery methods. The teacher's concerns included the pressure to complete the curriculum within the given time and to keep the

classroom focused on tasks. Managing class interaction was challenging but was addressed by using small groups within the classroom.

Preparing content to integrate with the fun tools required significantly more time, and the teacher had to invest time in learning the new teaching methods. Despite the additional workload, the teacher found the process enjoyable and noted that students were excited and engaged in the activities. The technology-led games generated great excitement among the students. The dynamic classroom environment required the teacher to be adept and responsive, fully engaging with the learning process. Despite the extra effort, the teacher expressed satisfaction with the learning gains and the students' ownership of their learning.

The students from the experimental group reported that they found the content easy to understand and did not feel overwhelmed. They also found it easier to retain the information presented and could focus in class without distractions. They perceived active learning to be more effective than passive listening to a lecture. Moreover, the students from the control group found the lecture overwhelming and admitted to engaging in unrelated activities during the presentation.

CONCLUSION

The integration of engaging tools and an active learning environment significantly promotes learning gain and student satisfaction. Although this study suggests that learning outcomes are enhanced, it is important to note that the sample size is small, and the findings cannot be generalised to all contexts. Additionally, the content was specific to the sciences domain, necessitating further research to determine its applicability to other domains. Also, an in-depth investigation is required to examine the use of engaging tools across various fields.

ACKNOWLEDGEMENTS

Thanks to Karen Ong Guat Giow for her feedback on fun tools from her experiences. The Centre for Foundation Studies, University of Cyberjaya for the preparation of the Multiple-Choice Questions (MCQ) paper. Ms Renu Joseph for her research assistance.

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