Exploring the Synergetic Effects of Background Music, Gaminfication, and Interactive Learning in Smart Classrooms Ecosystem

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Abstract

This study explores diverse synergetic potential of integrated soft background music, gamification and interactive learning methodologies within the smart classroom ecosystem. It examines the significance of Soft background sound and gamification as pedagogical elements that stimulate the affective domain of learners expediting consequential increase retention among them. The study adopts Kraiger's "Model of Course Performance" as a framework to pilot the work. Thus, the research deploys an online survey on selected students' in Ahmadu Bello University Distance Learning Centre (ABU-DLC) for its primary data collation. From our analysis, the integration of soft background music and gamification elements with interactive technologies fosters pragmatic learning, critical thinking, and boost long term memory for long-lasting comprehension among learners. It concludes that soft background music, gamification and smart interactive techniques are indispensable learning mechanisms in online classroom system. Therefore, the ability of educators to rightly utilize them would enhance students' performance.

Keywords: Smart classrooms, Soft Background Music, Gamification, Interactive learning, E-learning.

Introduction:

Smart classrooms present a learning ecosystem for efficient dissemination of knowledge through the use of technological application/element. This has been a major feat in the twenty-first learning environment. A smart classroom permits an interactive and engaging learning environment that boosts teaching techniques, develops students' skills, and raises their academic level, through the right operation of availability technological components—such as interactive boards, audio/video elements, management system, and mobile computing (Kaur et al., 2022)

The focal point of smart classroom concepts is the positive engagement of learners for lifelong comprehension of the subject matter, thereby, promoting the objectives of E-Learning. One of the core objectives of E-Learning is to bridge the gap of education caused by the challenges of physical present of learners. This is done with the idea of active participation of learners in the virtual ecosystem. Like the physical classroom, there is need for active engagement in learning within the E-space, and turning the classroom space to a smart classroom experience. It is interesting to know that, gamification, smart technologies and soft background music supports active participation both in conventional physical classroom and virtual learning space (Dichevaet al, 2015; Savov et al., 2019).

Music has a special effect to the heart of man. Its ubiquity is universal. Its inherence in man goes beyond emotional essence to life sustaining value. The humanistic value of music is traced to our natural inclination to it from "cradle to grave". The impacts of music on learners cannot be overemphasized as its deployment within students' learning eco-system is tremendously felt worldwide. Basic concepts are taught easily through music and it boosts the memory span of learners. Aside being used as an instructional tool, music stimulates active participation in classrooms learning environment, builds confidence in learners and contribute to their academic improvement and creative output (Israel, 2013; Eddy & Wilson, 2004). This is possible due to its communal, affective, mystical, and emotional effects on humans, which harbours the ability to calm nerves and to spur expressive confidence in us. Its usefulness could be in the form of background soft sound or as songs to teach basic concepts. Aside from the application of music to engineer active leaners' participation is the use of gamification.

Gamification is the concept of utilizing game related activities in learning. Several scholars have seen this as a veritable means of promoting active learners' participation in classroom setting. The ideal of learning has drastically shifted from teacher centered to learners' centred. Gamifiation is one of the several means to actualize this innovation. Aside its relevance in the promotion of learners' engagement in classroom, its other values can easily be seen in aspects of motivation, stimulation to learning as well as promotion of subject matter comprehension. Again, it naturally improves learners' comprehension, as well as boosts their performance outputs.

Thus, the application of these two teaching techniques in traditional classrooms instructions have proven to be of immeasurable value to educators. Therefore, their utilization can also promote relevant values in smart classroom ecosystem which is challenged by distance and

isolation. The E-learning system, which is a virtual interactive space of learning has high propensity for learners to be isolated from classroom activities resulting to poor performance out. Although, several factors like tight work schedule, work fatigue, poor internet connectivity, indolence, inferiority complex, just to mention a few, can create learners' isolation within the classrooms ecosystem.

Therefore, this study examines the integration of Soft background music and gamification in smart classrooms environment for efficient learners engagements and improved quality education. The study carried out survey from selected current students in Ahmadu Bello University Distance Learning Centre (ABU-DLC) under the General Studies Unit (English and Communication Skill). Sample of the study cut across wide range of students assigned to E-Tutor OlorunmowajuAyodeleObatomi. The survey is basically on the usefulness of soft background music and gamification in online studies (E-learning) ecosystem. The aim of this study is to ascertain the currency of these two teaching techniques within the parameter of students' engagement in E-classrooms and their corresponding performance output. The outcome of this study fits as a template upon which educators can springboard in dispensing their classroom functions for effective and efficient E-learning learners' experience.

Theoretical Framework

The study adopts Kraiger's (2003) "Model of Course Performance" as a theoretical frame to pilot the work. This model is similar to Campbell's (1990) model of "Job Performance." The Model of Course Performance according to Kraiger states three vital elements that are determinants to students' learning performance which are: motivation, (willingness to learn), trainability (teachability) and the learning environment. The study did not solely utilize Gamified learning theory as it can be aligned into the Model of Course Performance which is its primary aim. To actualize the first parameter for students' course performance, right usage of soft background music and gamification can be relevant. These two concepts or mechanism can help transform the learning environment (classrooms) to stimulate effective learning. Lasting, both the use of Gamification and Soft background music, can help stimulate learners' wiliness/interest to learning, thereby, improving their trainability. Thus, this models proposes that for efficient learning to take place, each of these elements must be present in some measures. While the certainty of the measure is indefinitely stated, one can claim that the absent of any of the elements, cannot guarantee learning taking place.

Music in Learning Environment

The entirety of learning is to impact new knowledge to the learners. Beyond the impartation of new knowledge to the learners in the smoothest possible way, is the ability to sustain it for last longing experience. Several factors can militate effective learning in classroom environment. Some of these are: the emotional state of the learners, environmental situation and psychological position of humans, which can trigger positive or negative emotions. While negative emotions hinder learning, positive emotions promote effective and efficient learning experience. One of the antidotes educators can use to set the desired atmosphere for learning in their classrooms is music. For instance, when conducting a classroom activity, simply playing soft background music while students are working, sets the desired mood for learning, according to Mojtaba and Mostafa, (2014).

More so, music has been proven to posse magnetic power that transforms the mood of the listeners and can transform them from sorrowful to joyful state. One might be wondering how this occurs, but, Brewer (2005), helps us to understand that both the rhythm and tempo of musical sounds interplay on our emotion, attention and focus, giving vitality to our weary body, and soothing our nerves. Thus, Hilda corroborates this claim that "Music and song, whether pop, rock, kwaito, rap, Rhythm & Blues, hip-hop, house… healed the world and made it a better place for these learners" (Hilda, 2013, P.360). For her, the usage of music as a background sound in the learning environment is a deliberate innovative teaching techniques/tools to enhance learning and increasing learners' progress. While it is one thing to use music in classroom setting, it is another thing to deploy it rightfully and timely.

It is important to note that the period of the day determines the type of music to incorporate in the lecture, especially for background effects. Ideally, from 4:00 am down to around 10:00am, blues and soulful music promises to be suitable for the human body system due to the underlying slow tempo. At this point in time, the body system is calm and has not been exercised enough for fast heartbeat and pumping of the blood. But at noon and after noon, Hip hop, Jazz, and fast high life music would fit, as the body is ready for fast movement corresponding with the respiratory and metabolism hyper activities. Again, at evening time, the body seems tired and weary from the excessive activities of the day and sound reception, therefore, needs rest. Cool Jazz, soul music, country and slow high life would help give breath to the soul for comprehension. Aside the time of the day for lecture, the desired activities for the lecture can determine the kind of music needed in the learning environment. Thus, Mojtaba, & Mostafa. (2014) rightly observes that:

> If students are working in groups and certain individuals need to be enlivened, playing upbeat music can get students energized and motivated to participate. If students return from P.E hyper and need to quickly begin sustained silent reading, playing softer, slower, music can aid in soothing and calming students down in order to have them focus. Since music has the power to facilitate desired moods, it can have a positive impact on those students who have disorders. (p.2)

> Furthermore, Brewer (2005), explicates more on this that "the rhythms and tempo of musical sound can assist us in setting and maintaining our attention and focus by perking us up when we are weary and helping us find peace and calm when we are over-energized in some way" (p.11).

Furthering on the claim that certain musical form creates definitive mood in the classroom environment, (Vande, 1986), speaks of jazz improvisation which stimulates people, even children for active theatrical participation making learning enjoyable experience and stimulated to the students due to the evoking steady beats, rhythm, and volume of the music. Music is a world language. It communicates meaning and feelings. In fact, both music and language are ways through which humans communicate through sound and gesture. Therefore, music can be used in instructing language by advancing by receptive processed sound (Stansell, 2005). Music triumphs where language fails. This exemplified the meta-poetics of music and its psychological potency on learners' mood in daily life (Moticoe, 2008).By that it has tremendous effects on student's academic accomplishment, motivation and creative improvement (Eady& Wilson, 2004). It is an innate part of a person's being. Depending on taste, it soothes and relaxes, inspires and motivates. Used carefully in the learning situation, it can turn the beat of the learning process around positively and ignite joyous mood around the classroom and spur participation.

Gamification in Smart Classrooms

Gamification is a new concept of learning that promotes learners' motivation and performance through experiential experience of game-based activities among peers in a classroom. Several scholars have postulated thoughts about the term gamification which we shall consider to pilot the discussion and for comprehensive comprehension of the term. From a purview definition, "Gamification and game-based learning are very popular mobile and technological trends that use game elements to promote desired behaviours and drive corporate learning outcomes" (Zamzamiet al, 2020, P.1).The term 'game-based learning' describes the use of gamified content as an e-learning technique to meet instructional goals (De-Marcoset al, 2016). Others see it as imbibing the practice of game elements in none-game environments. (Zimmerling et

al., 2019; Schöbel et al., 2020; Ding et al., 2018; Domínguez et al., 2013), and this concept has been applied in a varied variety of fields in the current years (Pedreira et al., 2015).

From the foregoing, gamification simply means a game-based learning process as instructional techniques in learning environment and has been a useful teaching technique in our contemporary times. This technique can be used in either virtual classrooms or Physical interface. The idea of applying gamification to non-game context made it a bit scientific and needs strategic process/planning to make it effective. A good examples of game based activities commonly incorporated in learning are levels, points, badges, leader boards and avatars (Barata et al., 2017). These are structural positioning or elevation of learners' which have enormous motivation power.

Several other devices useful in gamified systems, are "combat, content unlocking, gifting, boss fights, quests, social graphs, certificates and memes" (Buckley & Doyle, 2017). To promote perfection, speed, accuracy, and intellectual intuitiveness, educator can deployed any of these mechanism in either the physical or E-classrooms to motivate learners' active participation. The level of learners, might also determine the ideal mechanism to use. However, reward system like gifts, can take several patterns without necessarily parting away physical cash but even through virtual cash. Memes or stickers from an educator to the learners for successful completion of task can motivate beyond expectations.

The gamification strategy provides benefits that go in accordance with the E-learning philosophy. First, gamification provide a better learning experience - having a ton of fun during the time spent learning would bring about more significant levels of engagement which, certainly, will prompt better memory and retention. Secondly, E-learning offers a more customer-oriented casual environment, where the learner could practice without being punished, especially if combined with gamification. Moreover, students could know the instant feedback of what they know or what they should know. Finally, gamification in E-learning could be applied for most learning needs, including sales, client supports, and so on in most of educational institutions or platforms (Sailer et al., 2017, as cited in Quoc Dung Phung, 2020).

Interactive Technologies in Smart Classroom on Students' Engagements:

One of the several advantages in the twenty-first century educational process is the profusion of technological devises/gadgets for smart classroom engagement. Among the several available of these devices are the mobile phones, tablets, and laptops which permit virtual learning interface especially through video conferencing, and audio visual pre-recoding and replay.

Interestingly, "Mobile devices are the preferred choice of media, and their massive use has produced a new generation of software for use in educational contexts (Kuatbekov et al., 2021; Papadakis & Kalogiannakis, 2020). This creates a positive impact on students' learning experiences. The deliberate and strategic utilization of technology in the learning environment to positively impact students' learning experience is term Smart Learning Environment (SLE) (Omirzak, et al., 2022). This Innovative learning environment paradigm, the smart classrooms, exists as a physical space enhanced with digital, and environment-responsive devices operational within an innovative learning environment (Cebrián et al., 2020). Three operational parameters: technologies, good learning environment, and procedures for learning, defines smart classroom learning (Palau & Mogas, 2019). By technologies, we refer to the smart devices like laptops, tablets and smart phone which are users friendly and available at the disposal of both educator and learners for learning engagement, which also can be deputize a portal for learning (Chiemeka& Ola, 2021). However, the learning environment is well designed by the educator and should be students centred. Above all, the educator set the pace for learning and defines the processes of learning in the smart classrooms.

Therefore, with the development of new mobile technologies, the variety of their functions, and popularity, smart phones have become an integral piece of human life regardless of age, gender, or economic status (Jabali et al., 2019). Even more, the user friendliness and accessibility makes it adaptable for all gender and classes of people for interaction, and increase more participation in educational processes. This widespread use of technology, continuous information updates, open access to widespread information at any point in time triggered to the rise of distance learning, e-learning, and mobile learning. In fact, wireless technologies and mobile devices are quintessential in popularizing these concepts (Omirzak et al., 2022). Although, the Covid-19 pandemic lockdown which gives birth to the new normal, greatly influence the sporadic spread of E-learning educational system. However, the widespread usages of technological devices greatly become educationally beneficial to both students and educators. (Zengin et al., 2018).
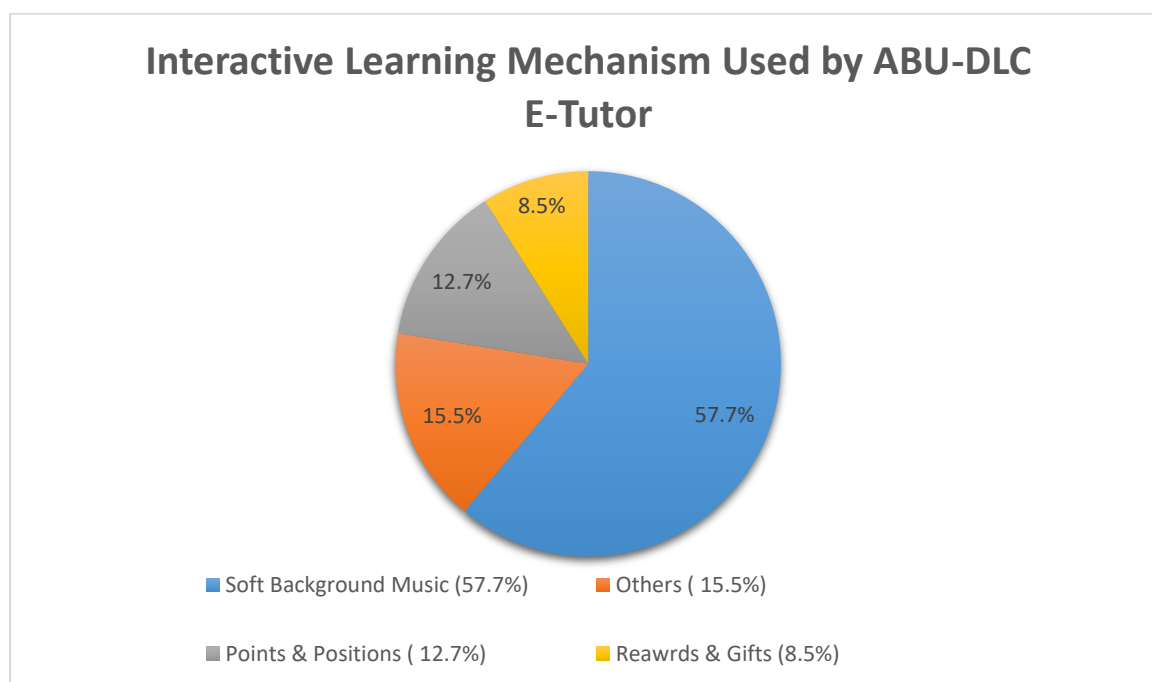
Several components ranging from interactive whiteboard, audio-visual media devices, mobile devices…and Learning management System (Al-Hunaiyyan et al., 2017), help define an ideal smart classroom. The smooth operational value of smart classroom ecosystem is only proficient with the aid of effective and efficient internet connectivity. Having a great and functional internet bandwidth promotes efficient accessibility and operation of the content and activities in E-learning system. Again, actualizing an effective implementation of smart classrooms

hangs on the pedagogical prowess and digital proficiencies of teachers. Therefore, constant teachers' training programmes designed for correct usage of the smart classroom know-how and the development of digital competencies in critical implementation of the Smart Classroom concept becomes pertinent. (Cebrián et al., 2020).

Data Presentation, Analysis and Discussion

This study deploys a survey from current E-learning students from Ahmadu Bello University Distance Learning Centre (ABU-DLC). The survey comprises questionnaire with structured questions for guided and unguided responses. The aim is to uphold objectivity and silent tendencies of subjectivity and absolutism in the research. Certain questions that span through the relevance of soft background music as well as gamification in E-learning ecosystem were raised from 79 respondents' and analysed for discussion. The responses are seen below:

Sample Response 1 on:

Interactive Learning Mechanism Used by ABU-DLC E-Tutor

- Soft Background Music (57.7%)
- Others (15.5%)
- Points & Positions (12.7%)
- Reawrds & Gifts (8.5%)

Source: Researchers' Survey data, 2024

It is evident from the chat about that 57.7% responses which is the highest, went soft background music, while 15.5% responses indicates others, 12.7% shows points and position and 8.5% which is the least identify rewards and gifts.

The responses from this sample questions generated several responses which shows that ABU-DLC E-tutors' have experimented various learning mechanism in their E-learning classroom system. To evaluate the effectiveness of the various interactive mechanism used would be clarified by the responses from the next sample questions.

Sample Response 2 on: Rating on their effectiveness in the online learning environment.

The responses here are categorized under three sections: 0 -49% = below effectiveness; 50% – 79% = effective and 80 – 100 = very effective. From the responses received, 36.1% the usage of interactive learning mechanism as very effective and impactful, and rates 58.3 % rates it as effective, while 5.6% rates it as less effective. The statistic is impressive as about 94.4% states the deployment of interactive mechanism stimulates positive impacts on learners within the Online learning environment. The negative level of it is very infinitesimal as seen and one would not know if the fault is student related or educator related.

Sample Response 3 on: The need for soft background music while studying.

This question is to help educator know students preference and include that in their classroom plan and management. Interestingly, we have the following responses: 69.4% respondents are affirmative about it, while 23.6% frown at I, and 6.9% are indifferent about the use of soft background music while studying. It could be they have not experimented on it. Well, the positivity of this is still at the highest degree.

Sample Response 4 on: The mood created by soft background music in E-Learning Environment.

This is an unguided question and responded are at liberty in their responses. We received both positive or negative responses to the positive outweigh the negative. The following are some of the positive mood soft background music creates in learning environment by the responded: Happy and relaxed mood, very happy mood, calmness, it helps calms the nerves, it makes learning more effective, ignites good thinking, it eases the mind and boosts the brain for effective learning and assimilation. Others responses are: It creates a serene, calm, and enabling environment and facilitate active learning. Also that it motivates learners to make them more attentive in class. That soft background music in E-learning environment influence mood positively, thus fostering comprehension. It awakens the brain and allows the mind to accept new things for storage. Again, that soft background music will motivate the learners; create sense of immersion, engagement, emotion and feedback for learners. The positivity are

numerous. However, a few negative responses were recorded that soft background music can be distracting because they love studying in very cool and quiet environment.

Response 5: Rate the use of Soft Background Music in your GENS 103 Course.
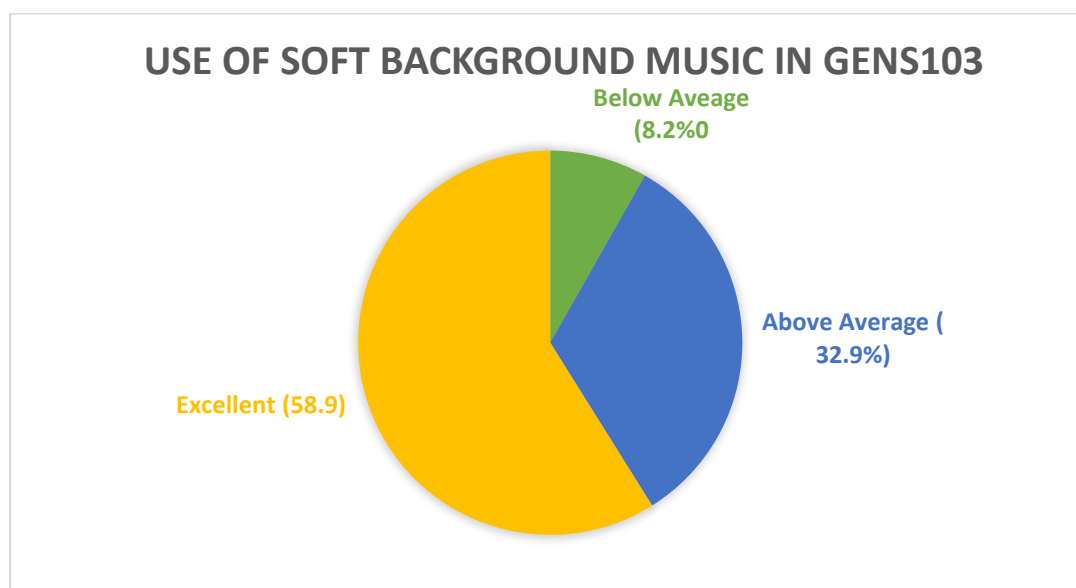
Source: Researchers' Survey data, 2024

The responses as displayed in the chats above simply signify the right usage of soft background music by this specific researcher. The aim is to evaluate if the usage of the soft background music is advantageous or irrelevant in his classroom management. Interestingly, about 60% of the respondents rate its use in the online teaching environment as excellent.

Sample question 6: Relevance of soft background music be incorporated in E-learning classrooms.

YES (52.7%)   NO (24.3%)   MAYBE (23%)
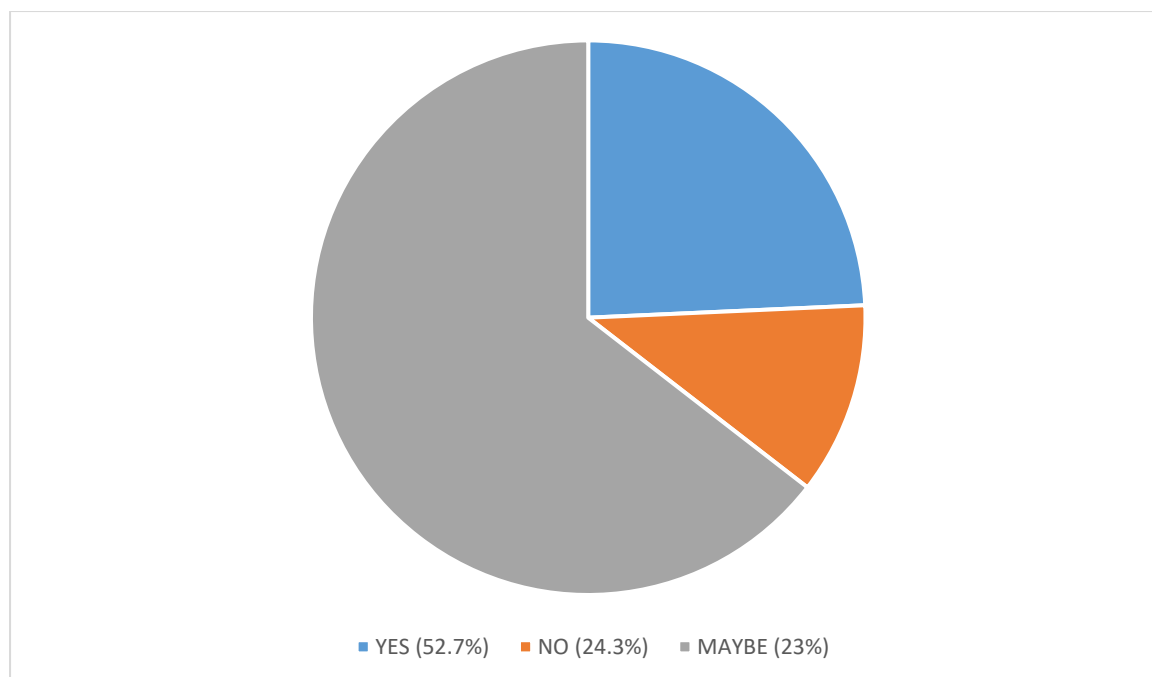
Source: Researchers' Survey data, 2024

Sample Response 7: The relevance of gamification in E-Learning environment.

This triggers several diverse responses of which also 99% are affirmative on the use of gamification in E-learning classroom. The specific responses are as follows: "good", "very good", "nice idea", "perfect", "superb", "excellent", "strongly agreed", and "it is awesome". Other responses appear in form of reason for the need of gamification in E-learning ecosystem and they are as follows: "it helps students to relax", "it encourages active learning", "and it will be of help and would boost students' participation". Others are "it is excellent because it makes students want to do better and also allows them ascertain their position after receiving lectures". While others posit that "it is a form of motivation", that "would help to ease tension" because "it is interesting", and "makes environment more comfortable", spurring "learners' interest on the tutor and lectures", thereby fostering learning. More compelling responses are noted as "it provides fun and motivation therefore enhancing retentive memory among students'. Another interesting responder states that "gamification can foster collaboration and healthy completion among learners, encouraging peer-to-peer interaction and knowledge sharing". This is key in universal education system where knowledge is not absolute, and no one can claim to be an island of knowledge. Concluding on this response is the lengthiest of them. "Gamification in E-learning environment can be highly effective in increasing learner engagement, motivation, and retention. By incorporating elements like competition, rewards, badge, and gifts, it adds a sense of fun and achievement to the learning process, making it more

enjoyable and interactive. Additionally, it can foster a sense of community among learners and promote healthy competition, which can further enhance learning outcome".

Response 8: Preferred ideal gamification techniques for active students' engagement in Online Classrooms ecosystem.

Preferred gamificafication for Online Classroom system

Competition (24.3%) ■ Rewards (32.4%) ■ Points (27%) ■ Gifts (8.1%)
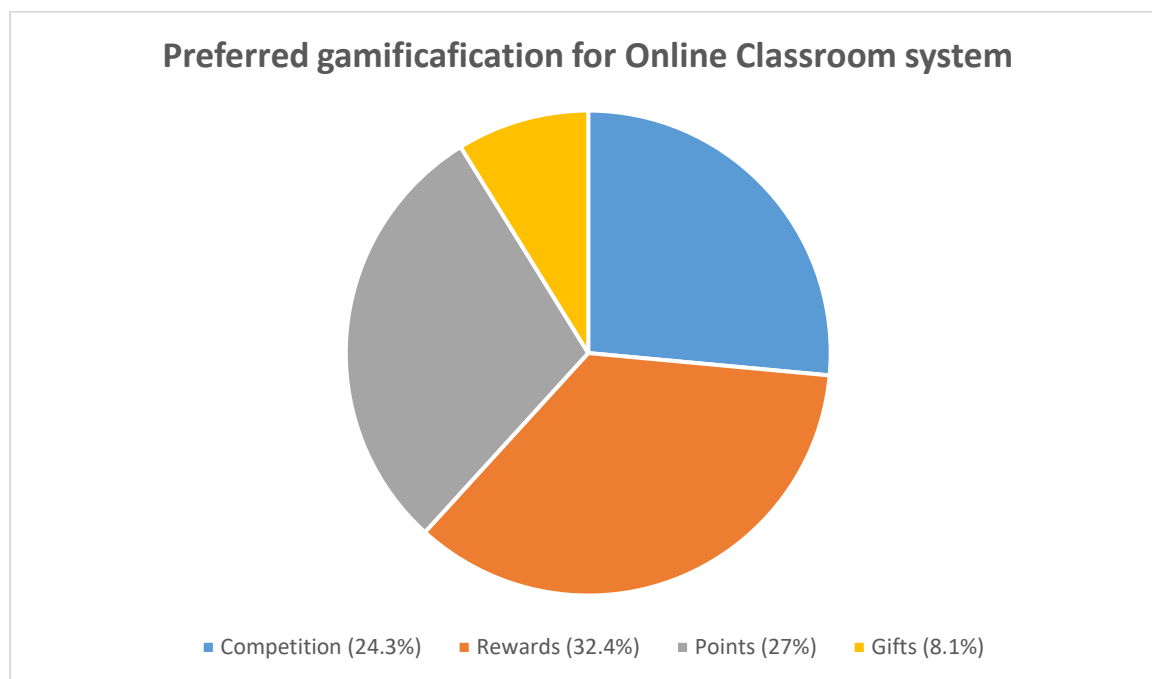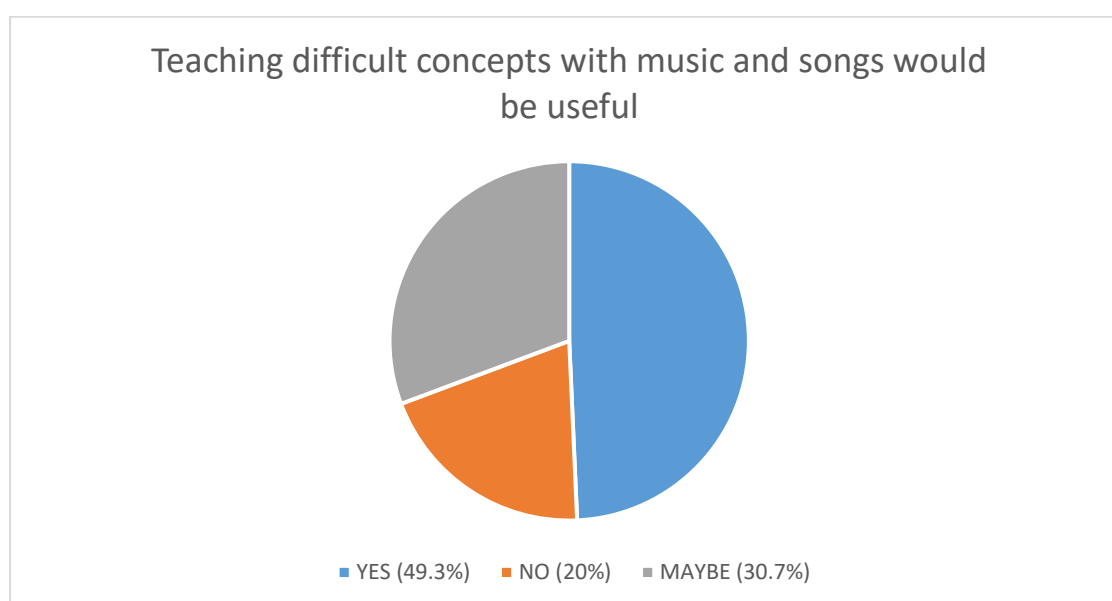
Source: Researchers' Survey data, 2024

From the above charts, reward is the preferred gamification mechanism needed for active learners' engagement. Next to it is points, then competition and least in the preference is gifts. Well, one would not be able to specifically identify the nature of the rewards, if it is associated to marks, financial rewards, or verbal acclamation.

Response 9: Suggested teaching techniques by learners for effective learners' engagement in a smart online classroom system.

The sampling here is an open order which permits objectivity as the researchers have no interference with modeling of the respondents' views. Subject to the respondents' opinion, the following are received data on other teaching techniques that can be deployed for effective classroom management: Competition, rewards, gifts, jokes, everyday examples to explain concepts, quiz, memes, and use of pictograms. Also, Initiate interaction and create faculty presence, set expectations and model engagement, games. Additional response like "besides traditional gasification, consider integrating gamified learning pathways where learners progress through levels or stages by completing tasks or mastering skills". Furthermore,

responses like the use of "background music", "interactive activities", "competition", "teaching with background music", "points", "using humour/storytelling to lighten the learning mood", "visual games", "mark reward", "videos", "mark reward", "name calling by lecturer to force everyone to participate", "singing", "animation", and several more. In all of these, the respondents identify engaging activities that spur them to active e participation in class. The listed items can be classified under the dual strand of gamification and music/song (either as soft background sound or singing).

Response 10: Respondents' level of acceptance of the use of music/song to teach difficult concepts for learners' comprehension.

Teaching difficult concepts with music and songs would be useful

■ YES (49.3%) ■ NO (20%) ■ MAYBE (30.7%)

Source: Researchers' Survey data, 2024

From the foregoing, the responses from the respondents simply speak in favour of utilizing music in teaching difficult thematic concepts across various courses in only educational system. Like the use of songs in teaching various continents or across the globe or major African rivers, we can also use it to teach vital or complex laws in Physics, Chemistry or the like. The fact remains that humans relates easily with music than mere words. Therefore, ability to be able to incorporate known song/music into classroom teaching would be an added advantage in effective classroom management process.

Conclusion

The place of music, soft background sound, gamification and interactive techniques in classroom leaning is quintessential to students' optimal performance. Soft back ground music

set the desired mood for learning by calming students nerves and songs help to transmit complex concepts in an easy was to them. Again, gamification motivates learner towards active participation, ignite their creative ingenuity and performance speed. Therefore, it is pertinent for educators to strive towards incorporating these performance learning mechanisms in their E-classroom management. More importantly, it would not be out of place for Distance E-Learning Ecosystem to set programmed auto-play soft music at the launch/login into the Learning Management System (LMS) to stimulate learners' minds, calms their nerves and ignite a positive emotion for learning once logged in.

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