GAFEE: 5 Steps to Teach Effectively

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Abstract: The authors first propose the GAFEE (Goal-Oriented Engagement, Autonomous Exploration, Feedback-Enhanced Explanation, Challenge-Driven Elaboration, Collaborative Evaluation, Iterative Design, and Technological Synergy) instructional design model, which is based on the integration of gamified teaching and the 5E teaching model. It aims to address the issue of gamification not being systematically incorporated into the curriculum, while also enhancing engagement in the educational setting, stimulating interest in learning, and achieving better learning outcomes. The theoretical application of the GAFEE model is demonstrated through a hypothetical case involving a fourth-grade English class, highlighting its potential to improve students' vocabulary acquisition, grammar comprehension, and speaking proficiency. The study argues that the GAFEE model offers a novel approach to enhancing instructional practices by leveraging gamification strategies. It also emphasizes the need for empirical research to validate the model's effectiveness and broader applicability in gamified educational settings.

Keywords: Gamification; 5E model; GAFEE instructional design

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1. Introduction

1.1. Research background

In the contemporary educational landscape, the integration of technology has become a pivotal force, reshaping the way knowledge is conveyed and absorbed (Deterding et al., 2011). One of the most significant trends to emerge from this technological convergence is gamification, a concept that has transcended mere entertainment to infiltrate various aspects of human engagement, including learning (Hamari et al., 2014). Gamification,

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as defined by its early proponents, involves the strategic application of game design elements in non-game contexts, aiming to enhance motivation, increase participation, and promote desired behaviors (Zichermann, 2011). The main objective of gamification is to increase engagement (Villagrasa et al., 2014). Gamification has been applied mostly in educational contexts (de-Marcos et al., 2017). In education, the use of gamification means the integration of game components in conjunction with different teaching approaches to enhance language teaching and learning, with the primary goal of increasing motivation(Boudadi & Gutiérrez-Colón, 2020). However, there remains a gap in the literature regarding the systematic integration of gamification elements with established instructional models, such as the 5E model, to form a comprehensive and scalable teaching strategy(González-Fernández et al., 2022).

The rise of digital technologies has spurred growing interest in game-based learning and the application of gamification strategies in education. Researchers and educators are increasingly investigating how game design elements can be integrated to create more engaging and effective learning experiences(Bakan & Bakan, 2018). Gamification has been applied not only in language learning but also across a range of disciplines, demonstrating its versatility in improving student engagement and learning outcomes(Connolly et al., 2012). Its potential to reshape traditional educational paradigms is noteworthy, especially given the increasing emphasis on personalized and student-centered learning environments(Dickey, 2007). However, despite the expanding research on gamification, systematic integration of gamified strategies within established instructional models remains underexplored. The 5E instructional model—comprising the phases Engage, Explore, Explain, Elaborate, and Evaluate—is a well-established framework that supports inquiry-based learning and the development of critical thinking skills(Bybee, 2019). Combining gamification elements with the 5E model could offer a structured means to amplify student engagement and improve educational outcomes in diverse learning contexts(Clark et al., 2012). Nonetheless, the challenge lies in aligning gamified elements with the pedagogical objectives of the 5E framework, while ensuring scalability and adaptability across various educational settings.

1.2. GAFEE model proposed

The GAFEE model comprises seven fundamental constructs: Goal-Oriented Engagement, Autonomous Exploration, Feedback-Enhanced Explanation, Challenge-Driven Elaboration, Collaborative Evaluation, Iterative Design, and Technological Synergy (see Figure 1). These elements are derived from the 5E model of instruction (Engagement, Exploration, Explanation, Elaboration, and Evaluation), with the last two constructs extending the model to allow for greater flexibility in design and technology integration.

Instructional design based on GAFEE aims to incorporate gamification to enhance the instructional experience, creating an engaging, focused, and personalized learning environment tailored to the needs of contemporary learners. GAFEE not only engages students through gamified elements in the short term but also fosters sustained motivation and deeper learning over time.

By integrating game-based mechanics into the structured phases of the 5E model, GAFEE offers a balanced educational approach. In the "Goal-Oriented Engagement" phase, gamified tasks are introduced to capture students' interest and motivation from the outset. During the "Autonomous Exploration" and "Feedback-Enhanced Explanation" phases, activities enhanced by feedback provide real-time responses, reinforcing learning through rewards and challenges. This continuous feedback loop deepens students'

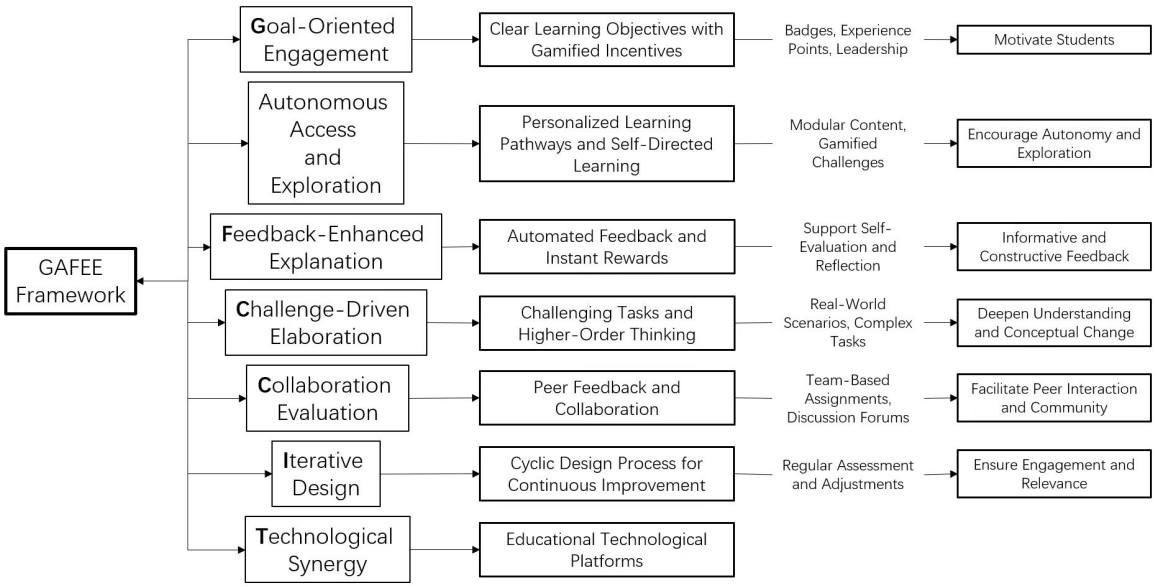

Fig. 1 The GAFEE instructional design

understanding of complex concepts and encourages persistence in their learning journey(G. Lampropoulos & A. Sidiropoulos, 2024). The GAFEE framework addresses the limitations of traditional gamification by promoting autonomy and collaboration. The "Challenge-Driven Elaboration" phase empowers students to engage in self-directed learning, allowing for customized learning paths based on individual needs and preferences. The "Collaborative Evaluation" phase fosters peer interaction and teamwork. Through this integration of gamification and the 5E model, GAFEE creates a balanced environment that maintains both intrinsic and extrinsic motivation while offering a clear pedagogical framework for sustained learning.

The GAFEE model establishes a systematic gamified instructional design that integrates gamification elements within the structured 5E teaching approach, addressing the lack of systematic integration in traditional gamification practices. It represents an innovative instructional design framework aimed at enhancing student interest, strengthening motivation, and improving teaching effectiveness.

2. Literature Review

2.1 Gamification in Education

Gamification refers to the incorporation of game elements such as points, badges, and leaderboards into non-game contexts to enhance learners' motivation and engagement (Sailer & Sailer, 2021). In recent years, gamification have been widely applied in educational settings, particularly in online learning environments(Koivisto & Hamari, 2019). Studies have shown that gamification can effectively stimulate students‘interest and improve their engagement and academic performance in the short term (Abuhassna et al., 2024) (Xu, 2022).

However, despite its positive impact on short-term engagement, the effectiveness of gamification in promoting long-term learning outcomes remains controversial. Most gamification rely on extrinsic rewards (such as points and badges), which may reduce students’ intrinsic motivation over time and lead to superficial engagement (John et al., 2023). Furthermore, existing gamification often suffer from fragmentation, lacking systematic processes and structured guidance (Huang et al., 2020). These issues suggest that traditional gamification approaches alone are insufficient to support complex educational goals and long-term cognitive development.

2.2 Limitations of Existing Gamification

Models in Education

To address the shortcomings of gamification, researchers have attempted to integrate it with various instructional models, such as the ARCS Motivation Model (Attention, Relevance, Confidence, and Satisfaction) and the PBL Model (Points, Badges, and Leaderboards) (Christopoulos & Mystakidis, 2023) (González-Fernández et al., 2022; Zhang et al., 2023). These integrated models incorporate game elements (e.g., points, levels, rewards) to enhance students' learning motivation while providing a structured learning process to improve learning outcomes.

Although these attempts have achieved some success, significant limitations remain. First, these integrated models are often designed for specific subjects or educational settings and lack cross-disciplinary applicability(Mazarakis & Bräuer, 2023). Second, the design of gamification tends to focus on short-term behavioral outcomes rather than setting long-term learning objectives that foster deep cognitive engagement(Jaramillo-Mediavilla et al., 2024). As a result, these models struggle to achieve consistent outcomes across diverse educational contexts and fail to provide a universal instructional framework applicable to various learning scenarios.

2.3 The 5E Instructional Model

The 5E Instructional Model (Engage, Explore, Explain, Elaborate, and Evaluate) is a constructivist-based instructional framework developed by researchers from the Biological Sciences Curriculum Study (BSCS) in the United States(Bybee et al., 2006). The model consists of five sequential stages that guide students through a structured learning process, gradually building deeper understanding and critical thinking skills(Fisher & Frey, 2021). Each stage—Engage, Explore, Explain, Elaborate, and Evaluate—plays a vital role in enhancing student engagement and encouraging active exploration, allowing learners to construct their own understanding and apply knowledge in a meaningful context(Anggraeni, 2021). This comprehensive learning pathway effectively supports cognitive development and has been widely recognized for its success in promoting inquiry-based learning and deeper conceptual understanding.

Additionally, the structured nature of the 5E model offers a systematic framework that can be applied across various educational settings, making it highly adaptable and versatile(Ruiz-Martín & Bybee, 2022). The model facilitates a smooth transition from initial engagement to advanced cognitive processes, ensuring that each phase is interconnected and builds upon the previous one (Joswick & Hulings, 2024). Such a structured approach not only helps students establish a firm conceptual foundation but also fosters long-term retention and application of knowledge (Garcia I Grau et al., 2021). This flexibility has made the 5E model a preferred choice for educators aiming to create inquiry-driven and learner-centered environments.

However, despite its many strengths, the 5E model may face challenges in sustaining student motivation and engagement, especially in digital or remote learning contexts. Without additional motivational elements, students might experience a decrease in engagement as they progress through the later stages, particularly when tasks become more complex or cognitively demanding(Georgios Lampropoulos & Antonis Sidiropoulos, 2024). To address this limitation, integrating gamification strategies can serve as an effective complement to the 5E model. By incorporating game-based elements, educators can enhance student motivation and ensure consistent engagement throughout the learning process. As proposed in the GAFEE instructional model, combining the 5E model with structured gamification elements offers a promising approach to creating a more engaging and motivating learning experience.

3. Methodology

This study employs a combination of three

distinct research methodologies: literature review, theoretical construction. These methods were systematically applied to construct the GAFEE instructional design model and assess its application in gamified learning within the context of classroom teaching.

3.1 Literature Review Method

The literature review method is a systematic approach used to collect, analyze, and summarize existing research within a specific field. It enables researchers to comprehend the latest advancements, research trends, and gaps in the literature, thereby providing a solid foundation for further research. The literature review allowed the authors to identify the limitations of current research and highlighted the necessity for the proposed GAFEE model. This review informed the development of the theoretical framework and provided critical insights into the design and evaluation of gamified learning systems.

3.2 Theoretical Construction Method

The theoretical construction method involves developing new theoretical frameworks or conceptual models by analyzing and synthesizing existing theories and research findings. This method is critical for explaining and predicting phenomena while offering theoretical guidance for subsequent research. In this study, based on an analysis of the literature on gamified learning and instructional design, the authors proposed the GAFEE instructional design model. The model includes seven key components that integrate game mechanics with instructional strategies to enhance student engagement and learning outcomes. The authors provided a detailed explanation of these components, relying on theoretical analysis and supported by case studies, to demonstrate how the GAFEE model can be practically applied in classroom teaching.

4. The GAFEE Instructional Design

4.1 Goal-Oriented Engagement: Integrating Clear Learning Objectives with Gamified Incentives

Goal-Oriented Engagement on the one hand, focuses on using clear learning objectives and gamified incentives while at the same time stressing on the achievement oriented goals that correlate with course learning objectives (Huang, 2019). Within this construct, it is crucial to set definite goals that the learners can strive to achieve. With the help of badges, experience points, and leaderboards, students will be more interested in continuing their learning process to achieve these goals. The practice of such incentives has been known to boost the level of intrinsic motivation among students and effectiveness of learning activities (Bai et al., 2022).For example, in the biology class, the students would get some points for doing the reading before the class for a new topic which makes the student prepare with the new content before the lecturer introduces it(Sari et al., 2017). This first involvement gets students ready for further investigation and fosters their interaction(Van Aalst, 2009).

4.2 Autonomous and Exploration: Tailoring Learning Pathways to Student Autonomy

The second phases in the GAFEE instructional design model is the Autonomous Access and Exploration which is comparable to the Exploration phase of the 5E model. In this way, applying the elements of the gamification approach, the students are allowed to work with the learning materials independently taking into account their learning peculiarities. Thus, the Al and modular experience teachers can design different learning pathways for the learners and guide them through those pathways when necessary(Krath & Von Korflesch, 2021).For instance, while studying programming, a particular student can grasp concepts through games that have varying levels of difficulty and after winning through each level, there may be a reward (Koivisto & Hamari, 2019).

4.3 Feedback-Enhanced Explanation: Leveraging Gamification for Informative and

Constructive Feedback

Goal-Oriented Engagement focuses on the combination of specific learning goals with elements of game design in order to increase students' engagement and learning gains(Huang, 2019). This approach acknowledges the importance of setting measurable targets in line with course objectives while at the same time being realistic about it. The elements like the badges, experience points as well as the leaderboards make the students to work hard in order to achieve these goals which are set from the learning material. It has been found that such incentives could positively impact students' interest in educational activities by a great extent(Bai et al., 2022).For instance, in a biology class, the students may get a certain number of points for having read some material before the class, hence exposing them to the new topic(Sari et al., 2017).This kind of interaction serves as the foundation for further investigation and enables students to act actively during the subsequent phases of instruction(Van Aalst, 2009).

4.4 Challenge-Driven Elaboration: Applying Knowledge through Gamified Complex Tasks

Being the last phase in the cycle known as 5E model, the GAFEE instructional design incorporates an improvement called Feedback-Enhanced Explanation. This approach effectively uses feedbacks with games in order to help the students grasp the ideas immediately and assist in the process of conceptual development. When feedback mechanisms are introduced and integrated with instant feedback in terms of rewards or status changes according to the student's performance, then the educational process can be enhanced in a way that can promote students' self-reflection practices (Gonzalez-Fernandez et al., 2022). For example, in a language learning course, students could interact in game-based dialog activities, and immediately get the comments on grammar and pronunciation (Hellín et al., 2023).

4.5 Collaborative Evaluation: Assessing Learning through Social and Interactive Components

Challenge-Driven Elaboration is based on the idea that knowledge should be applied, this is achieved through the use of game enhanced complex tasks which require the use of higher order thinking skills. In this way knowing is promoted by designing difficult exercises or quizzes that replicate real-life situations so that students expand and enrich their knowledge on the course material(Tanner, 2010).While studying the possibilities of using fantasy narratives in a learning environment, Bai discovered that learning with the help of a narrative in a gamified course can have a positive impact on students' performance in learning complex tasks(Sedan et al., 2013).For instance, in a business class, the learners could participate in a game economy where they use principles learnt in financial and strategy classes to manage the economy of the imaginary firm.

4.6 Iterative Design: The Cyclic Nature of the GAFEE Instructional design for Continuous Improvement

Design also points out that there has to be a process of development that is cyclic in nature. Thus, based on the findings, it can be stated that by conducting its constant evaluation and making the required changes, the effectiveness of gamification in teaching can be maintained at a high level and in tune with the learners' needs (Collins, 2004).This approach is in line with the design based research which is characterized by a cycle of design implementation and redesign (Hamari et al., 2014).

4.7 Technological Synergy: Harnessing Educational Technology to Support the GAFEE Instructional design

Applying educational technology to the GAFEE instructional design entails applying Technological Synergy with the different aspects of the model. With the use of Moodle and Zoom as primary platforms in education, one can design instructive effective,

engaging, and game integrated instructions. These platforms also allow for tracking the students' progress and providing instant feedback as well as moderating online forums, which all have a positive impact on the GAFEE instructional design.

5. The Way to Implement GAFEE Instructional Design

The GAFEE instructional design presented here provides a robust framework for designing engaging English courses for students. This section provides a step-by-step approach to the instructional design plan for a fourth-grade course on the topic "What Do You Like to Eat?" The goal of the course is to raise and practice vocabulary, grammar, and speaking with the focus on fun activities.

Thus, the GAFEE instructional design framework can be considered a highly effective instrument with which to design motivational and engaging gamified English courses. This document describes its application in a fourth-grade course that is based on the topic 'What Do You Like to Eat?' and considers vocabulary, grammar, and speaking.

5.1 Goal-Oriented Engagement: Harnessing Gamified Incentives to Achieve Learning Objectives

When it comes to the educational design the achievement of evident and reasonable learning outcomes is the most crucial for the setting of perspectives educational path (Glaser et al., 2001). In the context of a fourth-grade English course "What Do You Like to Eat?" The goals are strategically developed in such a manner as to incorporate the areas of vocabulary, grammar and speaking. These outcomes form the foundation on which the whole learning process is built upon.

(1) Clear Learning Objectives

As a teaching practice, the course begins with clearly stated goals for the students as a way of creating expectations and accountability of the learning process. These objectives are S M A R T based; Specific, Measurable, Achievable, Relevant and Time bound so as to show students that but not only they understand the expectations but also should be able to assess their own progress (Day & Tosey, 2011). This is important in ensuring that there is clarity of direction and goals which is very important in encouraging students to perform.

(2) Gamified Motivation

To increase interest and motivation of learners, the curriculum is filled with game components as learning stimuli (Malone & Lepper, 2021). One of the strategies used in this approach is the use of 'meal tickets', a currency eligible to the student, who completes assignments and participates in discussions. These tickets are not only icons; they can be exchanged for a range of virtual rewards including adjustments to the avatar's clothing, or entry into special events. It also is an effective way of encouraging participation and at the same time fosters a healthy motivational factor that gives one the feeling of achievement.

In addition, the gamification strategy goes beyond the use of the 'meal tickets' to use a wider range of the game strategies. Rewarding, such as points, badges, and levels are implemented into the learning process with reference to S.M.A.R.T objectives. All of these can be considered as signposts that indicate the student's progress and constantly remind him or her of the relationship between work and results. This structure of a game changes the learning environment into an engaging and an active environment where students are compelled to perform their best as they are able to see the relationship between cause and effect.

(3) Integrating Objectives and Incentives

The clear correlation between the learning objectives and the game elements is not just an educational concept; it is a system that redesigns the learning. It changes the classroom into a place that is not only a learning process, but also the process

of having accomplishments. This not only increases the level of student participation but also positively influence the formation of growth mind-set because the challenges are embraced as potential.

5.2 Autonomous and Exploration: Personalizing the Learning Experience

In the context of the current approaches to education, the focus on addressing learning differences is extremely important to enhance learners' outcomes. The GAFEE framework of instructional design, when incorporated into an English course for fourth graders under the theme 'What Do You Like to Eat?' is modular to provide a learner-centered approach. This structure is crucial in helping each student to move through curriculum as they desire at their own comfort.

(1) Interactive and Contextual Learning

The course is divided into sections with each section dedicated to a particular aspect of the general topic. The videos and other materials are created in such a manner that they can be used interactively in combination with quizzes, at the student's own time and schedule. This flexibility not only allows for the working style to cater for different learning styles of the students but also a deeper learning engagement. The content is based on the topic of food and meal, which is a topic of interest for students and hence makes the content interesting to them. This contextual learning approach acts as a medium of teaching and passing to the learner's vocabulary, grammar, and speaking skills in a real and interesting way.

(2) Role-Playing and Simulations

Another strategy that has been adopted in the course with a view of making the activities more interactive and interesting is through role play and simulations(Stevens, 2015). These activities are made in order to resemble real-life situations involved in the main theme, for example, ordering a meal in a restaurant, or describing favorite meals. The use of the simulations makes it possible for the students to practice the use of language in controlled conditions hence they are free to practice without pressures of being judged. Children are able to use English as they want, and are free to make mistakes, thus making this a safe ground for practicing English.

(3) Empowering Student Autonomy

This sort of freedom adopted within this paradigm is not only a teaching tool but a power tool that places learners in charge of their learning process. In a way, the course empowers the students to take their own responsibilities toward their learning process by offering them opportunities to be more independent in approaching the curriculum. This is made possible by the interactivity of the content where students are able to develop curiosity to search more information regarding the topic in question.

(4) Enhancing Engagement through Personalization

One of the ways through which learning experience is facilitated is through the adoption of personalization. Students are more likely to be engaged when they are allowed to collude with content which has been categorized basing on their needs and preferences (Thiele et al., 2014). This makes the active involvement as one of the significant approaches to learning since it enhances mastery and recall of the knowledge.

5.3 Assessment and Feedback: Enhancing Learning Through Continuous Reflection and Improvement

According to the contemporary approaches to education, the means of addressing students' individual learning needs remains one of the important factors for increased motivation and learning outcomes. According to the GAFEE instructional design framework, the course on "What Do You Like to Eat?" for fourth-grade English can be divided into the following modules: The fourth element of GAFEE is assessment and feedback, which is critically important in the educational paradigm since it helps to determine students' progress and promote the culture

of the constant learning and improvement. In the context of GAFEE instructional design framework, these elements are integrated into the course structure and delivery so that the students get the timely feedback which is constructive and helpful in their learning process.

(1) Formative Assessments

This is formative assessment embedded in the course structure with a set of assessments done at various times during the course. These assessments can then act as milestones which will help educators to track the progress of their students and give them feedback that is timely and adequate. These are therefore more than assessments of students' performance; they are also assessments that are meant to inform learning hence are more formative in nature. This approach is in conformity with the constructive alignment model of assessment where tasks are developed in a way that will promote intensive learning among the students.

(2) Peer and Self-Assessment

In addition, for the purpose of promoting more effective evaluation, the course includes peer and self-assessment activities. This practice stems from the assumption that the learners themselves are actors in the learning process. In this approach, students learn how to critically evaluate the work done by other groups and as well as their own work thus enhancing understanding of the learning material. Furthermore, it also promotes responsibility and accountability since students are forced to self-reflect and evaluate their learning process while also being tasked with critiquing their fellow students' work(Stranford, 2024). In addition to enhancing the learning processes, this approach to assessment fosters students for the cooperative and comparative processes that they are likely to come across in their academic and working life.

(3) Feedback-Enhanced Explanation

The course integrates the benefits of instant feedback using quizzes and other online tools that are built in the course. Such tools help students to get instantaneous feedback on their learning achievements while pointing out strong and weak aspects of the learning process. The real-time feedback loop is as important for the development of students' self-consciousness and personal growth. It helps students to track the effectiveness of their work and modify their learning behaviors and approaches which need to be improved. This is in form of an instant give back mechanism that encourages students to self-reflect and make necessary changes towards improvement.

5.4 Challenge-Driven Elaboration: Enhancing Language Skills through Contextual Application

This is the reason why all child-centered approaches stress the importance of using language in meaningful and functional ways. The "Challenge-Driven Elaboration" phase within the GAFEE instructional design framework is primarily created to offer students a chance to practice and apply the words and grammar in a creative and engaging manner.

(1) Virtual Restaurant Menu Creation

The activities that are assigned in this phase include the construction of a virtual restaurant menu by students. This task implies not only recalling and applying the vocabulary and grammar rules studied but also using them in an inventive and functional way. Students have to choose the dishes, explain what they are made of and what they should taste like, and present the given information in an interesting and informative manner to potential 'customers'. This activity also helps students develop critical thinking as they have to come up with a choice of words that would appeal to the potential buyers, the main goal of the activity, and the way how it can be achieved.

(2) Role-Playing Scenarios

From the construction of the menu, students simulate serving in the restaurant by acting as servers while the other students act as customers. In these simulations, the students are taken through the

actual use of the language they have learnt in a more lively and realistic setting. Specifically, they have to describe the dishes when serving other patrons, accept orders and make changes to request from patrons as servers, and ask questions, state preferences, and offer feedback as customers. These interactions allow students a secure setting for exercising speaking skills, improving listening skills, and a feedback from peers and teachers.

(3) Encouraging Creativity and Critical Thinking

These activities are therefore designed in a way that will make the students have fun while at the same time exercising their thinking and problem solving skills through the language used. For instance, when designing a menu for a restaurant, students may be required to come up with new dishes or find new ways of describing the taste of food. In the role-playing situations, they have to be creative, decision makers, problem solvers, and inter personally skilled and inter personally communicative(Daniau, 2016). These challenges compel the student to move from rote learning and be able to apply knowledge in a way that is meaningful and relevant to their daily lives.

5.5 Collaborative Evaluation: Cultivating a Community of Engaged Learners

Teaching and learning cooperation has been accepted as an important aspect of learning especially in language learning and teaching. The last step of the GAFEE instructional design framework is the "Collaborative Evaluation" which utilizes the collaborative learning in order to foster better appreciation and absorption of the course content.

(1) Group Discussions

It is imperative to note that group discussions are one of the key activities in the collaborative evaluation process. These discussions focus on cultural issues of the course, including food culture, preference, and cooking arts. It is important for the students to respond and express their ideas, their perceptions and their experiences which not only benefits the student but the entire class. The discussions are conducted in forms that encourage listening and responding as well as provision of constructive criticism, due to the culture of respect for intellectual differences encouraged in the course.

(2) Peer Learning and Knowledge Sharing

In this way, cooperation is an essential component of a student's or a learner's educational process in which he or she learns from peers(Chitac, 2022). The peers are as important in the learning process as the course content and teachers the students come across. Sharing of ideas which include recipes as well as the cultural practices makes the learning process more enlightening to the students as they are exposed to a wider and more diverse knowledge than in normal circumstances.

5.6 Iterative Design: A Dynamic Approach to Curriculum Development

Education is a very dynamic sector of the society and therefore curriculum development and change is very paramount in the current society. The idea of the 'cycling' process is captured by the 'Iterative Design' step in the GAFEE instructional design framework.

(1) The Iterative Process

Iterative approach of curriculum development is one that involves implementation, assessment and modification followed by the next cycle. This process starts with introduction of instructions and material and activity and these are followed by constant evaluation processes. These could be in the form of students' performance results, the perceptions of the students and the teachers, and the general interaction between students and teachers.

(2) Adjustments and Refinements

Based on the data gathered from assessments and feedback, the curriculum is adjusted and refined. This may involve revising lesson plans, introducing new activities, or reorganizing the course sequence to better align with student needs and learning outcomes. The goal of these adjustments is to enhance the

effectiveness of the course, ensuring that it remains engaging, relevant, and responsive to the evolving interests and abilities of the students.

Therefore the assessments and feedback data collected and analyzed, the curriculum is modified and improved. This may imply changing the format of the lessons, adding new activities or altering the order of the lessons to fit into the needs and the goals of the student. These changes are a way of improving the overall quality of the course so that it stays fun and interesting as well as relevant to the students' present skills and what they are interested in.

(3) Ongoing Adaptation

The iterative design process takes into account the fact that learning is a continuing process and therefore a curriculum must be flexible(Burns & McPherson, 2017). Students may also progress to other level of needs and interests whereby the course may have to change as the students proceed. Such constant evolution helps to approach the course as an exciting process that can positively affect the development of learners in the process of education.

The "Iterative Design" process involved in the GAFEE framework therefore emphasizes on the flexibility and adaptability of the curricular models. Thus, following the assessment, feedback and reflection cycle, the educators can guarantee that the course is a lively platform for learning.

5.7 Technological Synergy: Harnessing Technology for an Enhanced Learning Experience

In the current learning environments, technology is not just an object but an agent that shapes the learning experience solutions(Fishman et al., 2016). The component of the GAFEE instructional design framework that corresponds to the "Technological Synergy" relates to the use of higher technological tools to design appealing, engaging, and personalized learning environments.

(1) Leveraging Learning Management Systems

Course content delivery platforms also known as Learning Management Systems (LMS) such as model form the central part of the digital learning process. These platforms are integrated and central points that offer students an array of learning resources that may include multimedia content, unit and interactive content, and more. It also tracks progress of the students so that both the students and learners can assess the results and areas that require more effort. In addition, the LMS promotes collaboration and builds a community that embraces the concept of learning through the collaboration tools such as the discussion forums, group working areas, and shared calendars.

(2) Synchronous Communication with Video Conferencing Tools

Applications such as Zoom are critical in enabling students to engage in synchronous communication, that is, real-time communication. These platforms offer the feature of virtual classes so that face to face conversations, group work and presentations can be done though the participants may be in different locations. Video conferencing tools enrich the process of learning as it provides the possibility of the interactivity and the feedback based on the real-time collaboration between the learners as well as the peer-to-peer educational approach.

(3) Immersive Technologies: VR and AR

The combination of both VR and the AR technologies has been seen to represent a major milestone in education experience(Familoni & Onyebuchi, 2024). By using the VR, students can be taken to various areas whereby they are exposed to various cultures, periods in history, or even real life scientific demonstrations. For instance, and in relation to the "What Do You Like to Eat?" topic, VR might recreate a trip to a foreign country's market in which students could hear, feel, and smell the environment linked with various food options.

AR, however, places digital information on top of the physical reality and provides contextually relevant and engaging learning experiences.AR can

be applied to language course: for instance, it will be easier for a learner to memorize vocabulary and grasp the meaning of the words when the words appear on the object around the learner. Not only does this technology increase student interest in the learning process but also it allows for the development of real life language skills.

Specifically, the GAFEE instructional design when integrated with a well-developed gamified curriculum creates the possibility of a revolutionary learning process for the fourth-grade students. Through the inclusion of the interest components including, clear goals, paths, feedback, escalation, evaluation, improvement cycle, partnership, application of technology, and other features, it is possible to create a popular and powerful English course that encourages the students to achieve their potential and learn effectively (See Fig. 2).

6. Discussion

This study presents the GAFEE instructional design model, which integrates gamification with the established 5E instructional framework. By addressing the lack of systematic gamification in educational curricula, GAFEE—comprising Goal-Oriented Engagement, Autonomous Exploration, Feedback-Enhanced Explanation, Challenge-Driven Elaboration, Collaborative Evaluation, Iterative Design, and Technological Synergy—aims to enhance student engagement and improve educational outcomes.

The GAFEE model contributes significantly to educational literature by offering a structured approach that harnesses gamification's motivational aspects while retaining the pedagogical depth of the 5E model. A theoretical application involving a fourth-grade English class demonstrates its potential to boost vocabulary acquisition, grammar comprehension, and speaking proficiency.

Compared to existing research, this study extends the understanding of how game design elements can be systematically incorporated into instructional models. While prior studies have highlighted gamification's role in increasing student motivation and engagement, they often lack a cohesive framework for integrating these elements into structured teaching. GAFEE fills

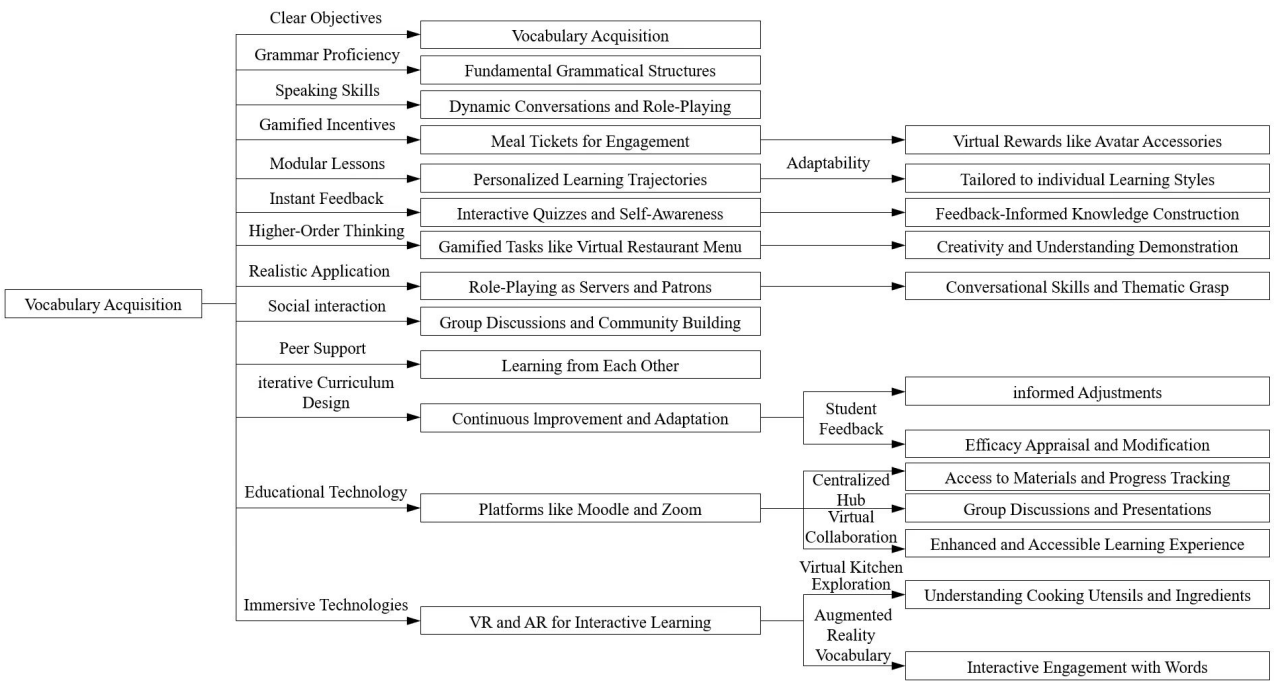

Fig. 2 The design of an English class

this gap by providing a clear, adaptable strategy for various educational contexts.

Moreover, the study emphasizes the interplay between intrinsic and extrinsic motivation in learning. Although gamification has been criticized for potentially diminishing intrinsic motivation through excessive reliance on extrinsic rewards, the GAFEE model's balanced approach fosters both motivation types by ensuring that students engage with meaningful learning experiences.

This study has limitations. It is primarily theoretical, and the effectiveness of the GAFEE model requires empirical validation. Future research should focus on real classroom applications to measure its impact on student engagement, learning achievement, and motivation. Additionally, more in-depth exploration of specific game elements, such as badges or leaderboards, is necessary.

7. Conclusion

The GAFEE instructional design model integrates gamification with the 5E framework to enhance student motivation and learning outcomes. By combining game mechanics—such as goal-oriented tasks, autonomous exploration, feedback-driven explanation, and collaborative evaluation—GAFEE addresses motivational gaps in traditional instructional methods. Additionally, the model incorporates iterative design and technological synergy to maintain adaptability in diverse educational contexts. While the theoretical foundation is robust, further empirical research is necessary to validate its effectiveness in promoting sustained student engagement, deeper learning, and improved academic performance across various educational settings.

Although this study provides a theoretically grounded introduction to the GAFEE model, several limitations highlight the need for further research. First, the GAFEE model remains a conceptual framework that requires empirical validation in real classroom settings to determine its practical effectiveness. Second, while the model offers a comprehensive approach to instructional design, it does not fully account for individual learner differences, such as varying learning styles and prior knowledge, which can significantly affect how students interact with gamified content. Additionally, the successful implementation of the GAFEE model assumes a baseline level of technological proficiency among both educators and students, which may not be consistent across diverse educational contexts. This could limit its applicability in less technologically advanced settings. Moreover, the emphasis on iterative design calls for continuous evaluation and adaptation, potentially imposing a substantial demand on institutional resources, including time, expertise, and infrastructure support. Finally, the study does not explicitly consider the potential negative consequences of gamification, such as promoting excessive competition or shifting students' focus from intrinsic learning objectives to external rewards. Addressing these challenges in future research is essential to ensure that gamified instructional models are both effective and pedagogically sound.

8 Limitations

However, some of the limitations that should be taken into account are pointed out in the following section.

Lack of Empirical Validation: This current study is mostly theoretical as it provides a theoretical orientation of the GAFEE model. However, the proposed architecture and the underlying theoretical framework is fully compatible with the current research on gamification and motivation, though empirical confirmation is necessary in this case. Therefore, future studies with actual practice and data collection are required to measure the effectiveness of the GAFEE model on students' engagement, learning achievement and motivation.

Game Design Elements: What this means for gamification is that the choice and application of

game elements that need to be transferred to the future context must be chosen and applied very consciously. The GAFEE model includes such items as badges, leaderboards, and challenges but does not explain how to design them or how they should be used. It is recommended for future studies to examine the effects of various and appropriate combination, as well as variations of the design features on the levels of engagement and learning.

Technology Integration: According to the GAFEE model, the focus is made on the use of facilities and tools in educational technology. However, a problem with such technologies lies in their accessibility and usability as well as in their familiarity to students. Furthermore, there is need to identify future research areas; for instance, addressing issues of technological hitches and constraints in telemedicine.

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