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Learners' growth mindset: Can bichronous gamified/interactive content make a difference?

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ABSTRACT

Background and Objectives: Educational psychology is one of the core concepts in the area of teaching and learning and plays a key role in any educational context including language instruction. Learners' mindset (fixed or growth) may have an impact on the learning process and the ubiquitous technology can be of influence in making a change in students' mindset. Despite the claim that through practice learners can improve in their subjects, many still consider it futile without related innate intelligence. Finding solutions for shifting this detrimental mindset is essential. Therefore, this study aimed to clarify the effect of using gamified and interactive content (H5P) on shifting English learners' mindset, moving from a fixed mindset into a growth one. Another purpose was to discover the probable relationship between learners' different General English (GE) levels, the rate of their initial mindset, and the proportion of change induced in their mindset throughout the course.

Materials and Methods: The participants consisted of 225 students aged 12-13 (111: experimental; 114: control). After conducting a placement test and using Dweck's (2017) mindset questionnaire to measure their initial mindset, both groups went through a 12-week-long course, receiving similar instruction, except for the teaching phase. While the experimental group's course was conducted through gamified and interactive content hosted on the Learning Management System, the control group's was conducted live through web conferencing. Afterward, the learners redid the questionnaire. Data analysis was performed using ANCOVA and ANOVA statistical tests.

Findings: To compare the GE levels two by two, a Scheffe test was used, and based on its results, it can be deduced that mindset differences mean for Pre-A1 (p = 0.001), A1 (p = 0.001) and A2 and above (p = 0.025) were all significant. Comparing the mindset differences means between the three English level groups, it can be inferred, however, that the Pre-A1 group was the highest in mindset differences mean, while A2 was the lowest. In other words, the weaker was the students' level of GE, the higher the amount of change in their mindset type towards a growth one. The findings of the present study showed that the use of gamified interactive content (H5P) in the bichronous format of the LMS can have a significant effect on improving high school EFL learners' Growth Mindset levels by 39%. The contents, which were provided for students in both gamified and H5P classes, resulted in immediate feedback exchanges, which raised the motivational level and encouraged them to go on with different interactive tasks and activities.

Conclusions: After carrying out the research, the researchers concluded that using gamified and interactive content as part of the learning process could induce a Growth Mindset in learners, higher GE students mostly had higher initial rates of Growth Mindset, and weaker learners experienced greater shifts towards growth. This study can motivate language learners and teachers to utilize gamified and interactive content in online courses and can help educational system policymakers notice more deeply the effect the application of gamification and H5P plugins have on teaching English, which can result in new curriculum development for schools.

NUMBER OF REFERENCES
43

NUMBER OF FIGURES
3

NUMBER OF TABLES
9

ذهنیت رشد زبان‌آموزان: آیا محتوای ترکیبی بازی‌گونه/تعاملی می‌تواند تفاوت ایجاد کند؟

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چکیده

پیشینه و اهداف: روانشناسی آموزشی یکی از مفاهیم اساسی در حیطه تدریس و یادگیری است و نقشی کلیدی در هر بافت آموزشی از جمله آموزش زبان ایفا می کند. ذهنیت (چه ذهنیت رشد و یا ثابت) فراگیران ممکن است روی فرایند یادگیری تاثیرگذار باشد و فناوری با قابلیت حضور همه جائی خود احتمالا بتواند در ذهنیت دانش آموزان تغییر ایجاد کند. علیرغم این دعوی که فراگیران از طریق تمرین میتوانند در دروس خود پیشرفت کنند، بسیاری هنوز این امر را بدون داشتن هوش ذاتی بی فایده می شمارند. یافتن راه حلی برای تغییر چنین چارچوب ذهنی ضروری است، کاری که امکانات انگیزه بخش فناوری برای انجام آن مفید به نظر می رسد. به همین جهت هدف این مطالعه شفاف‌سازی تأثیر استفاده از محتوای بازی گونه شدگی و تعاملی (H5P) در تغییر چارچوب ذهنی فراگیران نسبت به یادگیری به چارچوب ذهنی رشدی است. همچنین، هدف دیگر آن کشف ارتباط بین سطوح مختلف زبان عمومی فراگیران و نوع چارچوب ذهنی اولیه آن‌ها و میزان آن، و مقدار تغییرات ایجاد شده در چارچوب ذهنیشان در طول دوره است.

روش‌ها: این پژوهش طرح نیمه آزمایشی پیش آزمون/پس آزمون دارای گروه کنترل است. شرکت‌کنندگان شامل ۲۲۵ دانش آموز ۱۳-۱۲ ساله دوره اول دبیرستان (۱۱۱: گروه آزمایش ؛ ۱۱۴: گروه کنترل) بودند. پس از انجام آزمون فلایرز کمبریج برای شناسایی سطح مهارت انگلیسی آن‌ها، از پرسشنامه ذهنیت دوئک برای اندازه گیری نوع و میزان اولیه چارچوب ذهنی آن‌ها استفاده شد. متعاقباً، هر دو گروه دوره ۱۲ هفته‌ای را گذراندند و طی آن از هر یک مورد، به جز یک مورد، تدریس مشابهی را دریافت کردند. هر دو گروه از حالت همزمان سیستم مدیریت یادگیری برای تمرین کاربردهای زبان و از حالت ناهمزمان آن برای آزمون دادن و ارسال تکالیف خود استفاده کردند. تنها تفاوت در این بود که مرحله آموزش گروه آزمایش از طریق محتوای تعاملی در حالت ناهمزمان سیستم مدیریت یادگیری انجام گرفت، اما آموزش گروه کنترل به صورت زنده و با استفاده از تقریباً همان مطالب، از طریق وبینار انجام شد. پس از گذراندن دوره، فراگیران مجدداً پرسشنامه را تکمیل کردند. تحلیل آماری از طریق آزمون‌های تحلیل واریانس (آنووا) و تحلیل کوواریانس (آنکووا) انجام شد.

یافته‌ها: به منظور مقایسه سطوح انگلیسی عمومی (GE) بصورت دو به دو، از آزمون شفه (Scheffe test) استفاده شد. بر اساس نتایج آن، می‌توان استنباط نمود که ضریب تفاوت میانگین‌های ذهنیت برای سه سطح زبانی، ماقبل پیشرفته (-Pre A1) (p=۰/۰۰۱)، سطح پیشرفته ۱ (p=۰/۰۰۱)، و سطح پیشرفته ۲ (p=۰/۰۲۱) بود که همگی از جهت آماری معنادار بودند. با مقایسه میانگین‌های تفاوت‌های ذهنیت بین سه گروه و سطح زبان انگلیسی، می‌توان به این نتیجه رسید که گروه ماقبل پیشرفته، بالاترین میانگین تفاوت‌های ذهنیت را به خود اختصاص داد در حالی که سطح پیشرفته ۲ (A2) دارای کمترین ضریب تفاوت بود. به عبارت دیگر، هر چه سطح انگلیسی عمومی (GE) دانش آموزان ضعیف تر بود، میزان تغییر در نوع ذهنیت آن ها به سمت شکل‌گیری ذهنیت رشد بیشتر می شد. یافته‌های مطالعه حاضر نشان داد که استفاده از محتوای تعاملی (H5P) و بازی گونه (Gamified) در قلب سامانه مدیریت یادگیری دوزمانه (Bichronous LMS) می‌تواند تأثیر قابل‌توجهی بر بهبود سطح ذهنیت رشد زبان‌آموزان دوره دبیرستان (۳۹٪) داشته باشد. مطالب و محتوائی که برای دانش‌آموزان در کلاس‌های بازی گونه یا بازی واره شده و تعاملی ارائه می‌شد، منجر به تبادل بازخورد فوری گردید که سطح انگیزه را بالا برد و آن‌ها را تشویق نمود به وظایف و فعالیت‌های تعاملی مختلف ادامه دهند.

نتیجه‌گیری: پژوهشگران به این نتیجه رسیدند که استفاده از محتوای تعاملی به عنوان بخشی از فرایند یادگیری می تواند باعث ایجاد چارچوب ذهنی رشدی در فراگیران شود. دانش آموزان با مهارت انگلیسی عمومی بالاتر، میزان چارچوب ذهنی رشدی اولیه بالاتری داشتند، فراگیران ضعیف تر، میزان تغییر بیشتری را در چارچوب ذهنی خود از حالت ثابت به رشدی تجربه کردند. مطالعه حاضر می تواند زبان آموزان و معلمان را به استفاده از محتوای تعاملی و بازی گونه شده در دوره‌های آنلاین خود ترغیب کنند. همچنین به سیاست‌گذاران نظام آموزشی کمک می کند تا به تاثیری که کاربرد افزونه محتوای تعاملی و بازی گونه بر آموزش انگلیسی دارد توجه عمیق تری نمایند، زیرا این امرقابلیت آن را دارد که منجر به ایجاد برنامه درسی جدیدی برای مدارس شود.

Introduction

The inter-relationship between gamification and learners' conception or mindset types and the existing research gap on this issue has been accentuated in a large number of recent studies [e.g., 1, 2, 3, 4, 5, 6, 7, 8]. Game-based learning and gamified content and the way they interact with users' mindset in this new era are among the main concerns of scholars in the field of teaching and learning and that is why conducting research in this regard can play a crucial role in improving the caliber of our education system. Serving human beings for almost half a century, personal computers have, without a doubt, transformed into an almost necessity of life, and no less, education. Technology, and more specifically computer devices, has most significantly influenced the field of language education [9]. The notion of Computer-Assisted Language Learning (CALL) [10] was coined years after the invention of personal computers in the 1960s. Like CALL another terminology in the field of technology (i.e., Mobile Assisted Language Learning, MALL), became quite mainstream following the popularisation of smartphones in 2007. These tech tools have started to develop some modalities and modes of learning, which intensify the significance of carrying out more research on the relationship between the technological devices and the learners'/users' way of applying them and their conception of the potentials of these technologies.

As a matter of fact, many learners intend to add more various tech formations and use synchronous and asynchronous features of the Learning Management System (LMS) in order to learn different subjects and it is claimed by some research studies (e.g., [11-13]) that the use of technology (including gamification) can affect Learners' Mindset (either fixed or growth type). Their mindset refers to the way learners think of themselves and their learning abilities and the rate at which they relate their success or lack thereof in different areas of life to talent and intelligence or hard work.

The studies conducted on the role of LMS and technology on shifting learners' mindset, however, are rather sparse and have not focused on the effect that using asynchronous interactive content, once combined with the synchronous modality of the LMS, can have on Growth Mindset. There is still a gap on the use of gamified contents in LMS platform and the effect on the mindset of learners. There are also some research studies which have yielded contradictory results on whether the asynchronous and synchronous modes of technology-mediated classes do work as expected. This necessitates carrying out some novel studies on the inter-relationship between gamified content development and learners' mindset. Furthermore, whether students with different levels of proficiency in English are different or similar in the types of their mindset towards learning and how resilient they are in changing it are factors that require careful exploration in research. To address this need, this study aimed to explore how self-conducted use of gamified interactive content (H5P) for learning in the bichronous (a blend of both synchronous and asynchronous) format of the LMS may contribute to a significant effect (if any) on improving high school EFL learners' Growth Mindset levels. The major purpose was to investigate whether there existed any relationship between different levels of General English (GE) and the rate of change induced on their Growth Mindset levels when using gamified and interactive content, as well as with students' initial mindset levels.

Review of the Related Literature

Theoretical Foundation of Self-Determination Theory

The psychological state of human beings can have a direct effect on their behavior and activities. One of the macro theories that has dealt with this core concept is Self-Determination Theory (SDT) [14]. According to SDT, some motives (competence, autonomy, relatedness) are needed to drive the individuals and motivate them. This theory is indeed linked to the autonomous motivational dimensions of learning. It is based on the idea that by doing an activity we gain some values. Based on the tenets of SDT, it can be concluded that gamified activities and the mindset of the learners may have some potentials to boost their autonomous motivation and provide a higher level of involvement and interaction in the learning process, depending on the mode of technology or the content type developed, which are elaborated on, in the following section.

Synchronous and Asynchronous Modes of Technology

Initiated in the 1960s and defined as "any process in which a learner uses a computer and, as a result, improves his or her language" [15, p.7], CALL started to show its true potential during the 2010s with the increasing availability of the internet and technological devices such as laptops and smartphones. Following in its tracks was the growing use of Learning Management System (LMS) known as the software designed for administration of learning [16], as well as web conferencing which were applications or websites that have features such as live file and media sharing, mark up tools, hand raising, etc. used for collaboration and interaction [17].

A gamified form of content can be presented through different modes of technology one of which is LMS. Currently, it is a highlight of using technology for teaching and learning and can be used in different forms: synchronous, asynchronous or a blend of both, that is bichronous [18]. Synchronous e-learning, defined by Hyder et al., is "live, real-time (and usually scheduled), facilitated instruction and learning-oriented interaction" [17, p. 9] that is done online. Synchronous use of the LMS for pedagogical reasons usually involves employing web conferencing plugins (e.g., BigBlueButton and Adobe Connect). Asynchronous e-learning, on the other hand, is an online "self-paced learning, which students access intermittently on demand" and is usually available any time. It is "recorded or pre-produced" and can be individual, or "intermittently collaborative" [17, pp. 1-2]. Asynchronous use of the LMS for teaching involves activities such as making announcements, sharing the syllabus as well as files and media (e.g., videos, pictures, PDF, and PowerPoint files), interacting with other members of the class through forums and messaging, etc. Many of these features are available in web conferencing as well, but the main difference is that the latter occurs in real-time, while the former can be accessed at any given time (as long as the course is available). The Covid-19 widespread saw to a more common use of both synchronous and synchronous modalities of the LMS by students and teachers. The synchronous features are generally used through web conferencing plugins on the LMS, while the asynchronous features take place on the LMS itself, in the form of announcements, lessons, uploaded materials, etc. and more recently, through added gamification and interactive content (H5P) plugins.

Gamification

An important feature of the asynchronous format of the LMS is gamification, which was first defined by Brett Terill [19]. As accentuated in a number of studies [20, 21], gamification can provide the base for having more interactive classroom environment for the students and having a higher level of their engagement in learning tasks and activities. Following the socio-cultural theories of learning, it can be claimed that in gamified activities and group learning, the nature of acquisition process is changed and the cognitive-affective involvement of the learners is fostered. Recently, the students' level of social activities has decreased to a great extent due to the emergence of the new tech tools and the ubiquitous form of technology. This necessitates the application of some platforms and game-based learning so that their participation in social classroom activities is boosted and they are helped to step out of their comfort zone, being more engaged in language learning contexts. Gamification (as cited in [22]) has been defined as, "taking game mechanics and applying them to other web properties to increase engagement" [p. 18] and refers to using the properties of game design in contexts that are essentially non-game based [23].

Many gamification plugins became mainstream in course building on LMSs, the most prominent of which were progress bars, levels, leader boards, and trophies. One such plugin, used on the LMS Moodle, is LevelUp! which has two prominent features: a. each user levels up as they use the designed content and b. they can compete against other users with a feature called Ladder, essentially a leader board. Completing different activities and going through lessons adds to the users' points which add up and when enough, level them up. The Progress Bar, usually named so in different LMSs, allows the users to see how far they have

come and give them a sense of achievement. The gamification plugins became popular since they allowed for a better experience and further motivation for users. Therefore, some LMS content creators began using them in accompaniment with another interesting plugin called H5P.

HTML5 Package

In spite of the many common features between asynchronous and synchronous modalities of the LMS, there are some functionalities exclusive to asynchronous e-learning. A rather new feature of the LMS not available in web conferencing is HTML 5 Package (H5P). Initially released in 2013, H5P provided web learning with an asynchronous, yet interactive format, of commonly used content such as videos, presentations and quizzes. An H5P is "a free and open-source content collaboration framework based on JavaScript… [which] aims to make it easy for everyone to create, share and reuse interactive content" ("H5P", 2020, para.1). Simply put, H5P is an LMS plugin that allows creating interactive content, each provided for a different function. The immediate feedback that such content provides the students with is believed to motivate and encourage them in learning [24]. Furthermore, they allow the learners to learn on their own and receive proper feedback without the required presence of a teacher figure.

The interactive feature of the aforementioned contents allowed the creators to give constant feedback to users without being present all the time. In other words, H5P content was programmed in a way to interact with users based on their response to the questions, tasks, etc. Such content, by nature, provided the users with a gamified experience due to its motivational affordances such as the trial-and-error format, counting the points gained, giving positive feedback to the users,

showing them their progress, and providing them with challenges to overcome [25]. The use of gamification plugins, H5P content, and other synchronous and asynchronous technological tools provided the learners with new learning prospects and shifted learning to some point.

Gamification, H5P, and Learning

The aforementioned technological tools and their improvements provided opportunities for the learners to use technology for learning better [27-28] through both synchronous and asynchronous features of the LMS. Using gamification, language learning courses are usually designed, using gamified and H5P content features, such as dictation, interactive slides, interactive quizzes, flashcards, and mini-games such as crossword puzzles, and drag-and-drop matching games; made available on both mobile phone and desktop. Due to such classes' motivational affordances, both intrinsic and extrinsic, and the fact that such classes seem to invoke in the users a set of psychological changes similar to those invoked by games, the use of H5P content and gamification is believed by many to bring about positive psychological and behavioural changes [25] [29-30]. A psychological concept that could be influenced is learners' Growth Mindset, a concept many have worked on since Dweck's [31] initial development of the term in 2006 [31-37].

Learners' Mindset

This unconscious view that the learners hold towards intelligence and talent includes growth and fixed mindsets. Learners with a Growth Mindset believe that intelligence and abilities are not fixed and inherent, but they merely require time and practice to be mastered. On the other hand, learners with a Fixed Mindset generally believe themselves to be incapable of change and progress no matter how hard they

try or simply think they do not have the required skills and intelligence [38-39].

Having a fixed mindset towards learning can cause many problems for the learners, the least of which is being unsuccessful in (at least part of) their education. Many learners believe that they simply do not have the required talent for learning English and thus refuse to even try to learn. Changing this mindset, therefore, is of great importance. The attractive features of the asynchronous format of the LMS are a source of motivation and their self-conducted tasks which allow trial and error in a gamified format without consequences can bring comfort to students while learning.

When students with a fixed mindset face too many failures, they fixatedly believe that they are incompetent and resign, admitting defeat. This state of mind known as Learned Helplessness [40] needs to be dealt with in order for those learners certain of their failure, defeat and inability to begin shifting to a Growth Mindset. Those with a Growth Mindset believe intelligence and talent to be everchanging and growable, and see effort and hard work as the right track to do so. Their ultimate goal is to learn and grow, however difficult the means; therefore, challenges are desirable to them, since they see new challenges as a means of growth and development. They perceive failure as natural and a part of their journey to grow since they believe they can learn from it [31- 38].

The present study aimed to clarify whether using gamified and interactive (H5P) content can affect learners' mindset towards learning English and whether there is a relationship between students' GE levels and the rate of change induced in this mindset as well as its initial state. The dearth of research studies focusing on this matter led the researchers towards conducting this research. As mentioned before, the effect of using

gamification and H5P on some psychological concepts related to mindset, such as motivation, have been studied to some point, but even then the results showed inconsistency.

One study conducted by Inchamnan and Chomsuan [11] found gamification workflow, which focuses on the evaluation processes, and Growth Mindset positively related, however the bulk of research studies conducted regarding gamification and psychological outcomes which have yielded both positive and negative results asked for further research in this regard, thus the need for undertaking the current study arose.

Therefore, the current study intends to clarify this matter to some extent and discover the effect (in case there is any) that using gamified and interactive content can have on inducing a Growth Mindset in learners.

Fixed mindset can be detrimental and finding solutions on how to shift such a mindset into one of learning and growth in practice is essential. There are certain studies which have been claiming that practice leads learners to improvement in certain targeted domains. There are yet certain other groups, who believe that using lessons, which have proved ineffective and not working at class, will be a waste of time in absence of innate intelligence. However, the few research studies done on this matter have yielded mixed result. Therefore, this study aimed to clarify the effect of using gamified and interactive (H5P) content on shifting learners' mindset towards learning English into a Growth Mindset and answer the following questions:

- What effect (if any) does learning partly through gamified and interactive content have on changing learners' mindset towards learning English, from a fixed to a growth one?

- What relationship (if any) is there between learners' different General English (GE) levels and the type and rate of their initial mindset?

- What relationship (if any) is there between learners' different General English (GE) levels and the proportion of change induced on their mindset throughout the course using gamified and interactive content?

Method

Participants

The sampling procedure of the research was done through random and convenience sampling. First, six schools were randomly selected from the 27 schools available in the pool of data, consisted of the schools available in district 8 of Tehran, and were then randomly assigned to either control or experimental groups. Afterwards, to pick a representative class for each school, a second round of random selection was applied to the pool of samples available in each of the schools. The schools each had four to six eighth grade classes, one of which was randomly selected (cluster sampling, indeed). The classes however were left intact and were used through convenience sampling, since due to the fact that the classes could not be altered, the participants in each class were not homogenized. The participants consisted of 225 students studying at the eighth grade of high school, aged 12-13 years old, 111 (M = 39; F = 72) of whom shaped the experimental group and the other 114 (M = 36; F = 78), the control group.

After randomly assigning classes to either control or experimental groups, the students were all given a Cambridge Flyers test as a placement measurement, in order for the researchers to identify their level of General English as pre-A1, A1, or A2 and above. The students studying in eighth grade are generally supposed to reach an A1, or hopefully an A2 by the end of their primary high school years. Based on their result in the Flyers test, the students were divided into three groups: Pre-A1

(below their grade level), A1 (at their grade level) and A2 and Above (above their grade level).

Instrumentation

The questionnaire provided for evaluating the students' mindset was a 6-point scale questionnaire ranging from Strongly Agree to Strongly Disagree, and scored respectively from 0 to 5, developed by Dweck in 2006, and was used to gather the score of the participants' mindset. There were 16 items in this questionnaire. The rationale for selection of the questionnaire was its relevance, applicability, and availability in the market.

The questions in this questionnaire focused on students' view of their intelligence (e.g., My intelligence is something about me that I can't change very much) and talent (e.g., I have a certain amount of talent, and I can't do much to change it) with some questions covering both intelligence and talent (e.g., For performing well at school, innate ability matters more than hard work). The questionnaire has got high reliability, with an estimated Cronbach's Alpha of 0.84 for fixed mindset and $\alpha = 0.72$ for growth mindset. For the 16-item variant, since each item's point ranges from 0-5, the total score of the questionnaire ranges from 0-80, with 0 showing the strongest fixed mindset and 80 the strongest growth mindset.

Materials and Content

After ascertaining the teachers' ability to work with Moodle fluidly, the instructional content, including interactive and gamified content for the eight units of seventh grade and the four new units of the eighth high school grade were created on the LMS Moodle website, collaboratively by the teachers and the occasional aid of the researchers. It's worth mentioning that ability of the teachers to work with Moodle fluidity had been checked by having them work with it tentatively and necessary tips were given to them in the meantime. The web conferencing feature, (i.e., BigBlueButton) was provided on the platform in order to allow the learners in both groups to learn through mediation of bichronous environment.

Web conferencing allowed the teacher to speak using a microphone without halt and using the webcam if desired, and share presentations (ppt), PDF files and video sessions; Furthermore, a chat section and instant polls were provided. Moreover, this synchronous modality allowed the students to raise their hand, turn on their microphones, and interact with the teacher and their classmates, therefore creating quite an interactive space. The course, designed on Moodle, was provided for mobile phone (around 70 % of the learners used their phones), tablet, and desktop use, as can be seen in Figs 1-3.

The interactive content designed for the experimental group was placed in Tile Format to allow a better gamified experience (Fig. 2). Since, this study included students with three different linguistic proficiency levels, the interactive content was designed to afford to all the three levels.

The course was designed, using gamified and H5P content features, such as dictation (Fig. 3), interactive slides, interactive quizzes, flashcards, and minigames such as crossword puzzles, and drag-and-drop matching games; made available on both mobile phone and desktop. The gamified plugin LevelUp! as well as a progress bar was also added in order to provide a richer gamified experience (Fig. 2). Gamification was a process at the classes which let the participants to apply game's typical elements (for instance point scoring, competition with others, rules of play) and extend the elements to language learning activities. This way, the participants were involved in different kinds of teacher provided tasks.
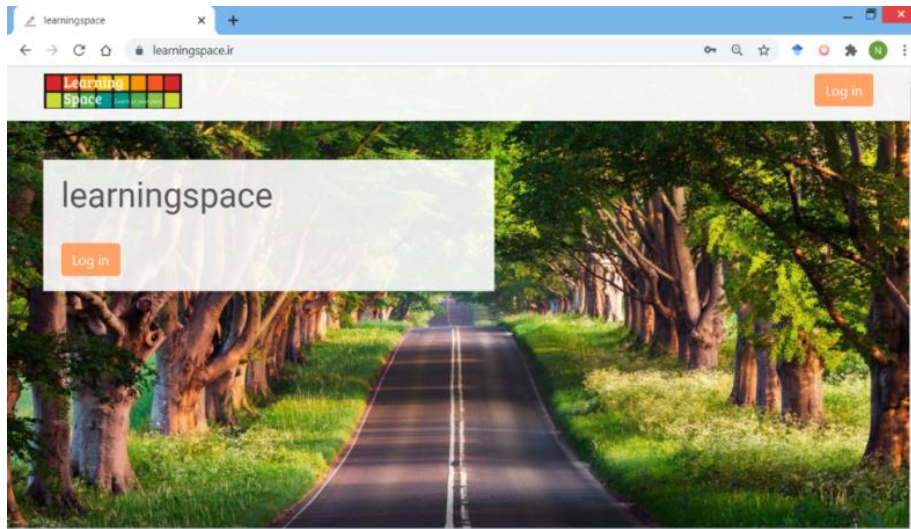
Fig. 1: Desktop/Mobile Phone Website of Moodle

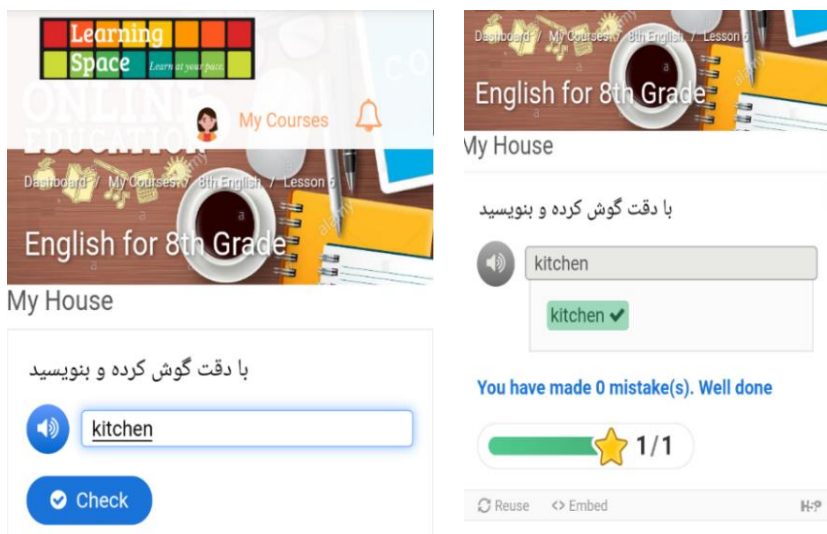**Fig. 2: Interactive Lessons Designed on LMS in Tile Format and the LevelUp! Feature**

Fig. 3: Using H5P Content for Dictation

Data Collection Procedure

The students in control and experimental groups were first asked to complete Dweck's [20] mindset questionnaire on Google Forms before going through the course in order to check their initial level of mindset. They were then given the Cambridge Flyers Test, ergo identifying their level of general English as Pre-A1, A1, and A2 and Above.

The students went through the course for 12 weeks, using their designed format of instruction based on their curriculum (one lesson almost every two weeks). Both groups received similar instruction in every way, but one. They both used the synchronous modality of the LMS for practising language functions, and the asynchronous modality of the LMS (alike flipped classroom) for taking quizzes and submitting their assignments; however, the teaching phase of the experimental group was conducted through interactive content hosted on the asynchronous modality of the LMS, while the control group's was conducted, using almost the same materials (i.e., videos, PowerPoint slides, etc.), through web conferencing and in a live format.

The total instruction time for both groups was two hours for each session, with the control group using this duration to learn the lessons and practise the learned language functions and their speaking skills on the web conferencing platform BigBlueButton, and the experimental group spending an hour on BigBlueButton for practising the learned language functions and speaking, and the other hour, on using the interactive content provided on the asynchronous modality of the LMS for learning the lesson. Whether they used this time in a single sitting or throughout the week, was their decision. Gamification tasks and the course modalities were distinctive features of such classes.

Throughout the mediation course the researchers remained in touch with the teachers of all groups and received feedback on how the students were going through the course. They did not, however, intervene with the process or show the students that they were involved in this process so as not to cause a Hawthorne effect in learners. After finishing the course, the students were once again given the mindset questionnaire and their responses and mindset rate were compared.

Data Analysis

Since this study was of a one experimental and one control group quantitative design, quantitative analysis of data using SPSS, version 22, software was required. The independent variable in the study was using gamified and H5P content for learning along with web conferencing, and the dependent variable was learners' mindset towards learning.

The data gathered through mindset questionnaire and students identified level of general English were analysed quantitatively. Therefore, the question of whether the self-conducted use of gamified interactive content (H5P) for learning in the bichronous (A combination of synchronous and asynchronous modes of technology-mediated classes) format of the LMS can have a significant effect on improving high school EFL learners' Growth Mindset levels was analysed using MANCOVA, since there were covariates that could corrupt data analysis. Respectively, the second research question (i.e., What relationship (if any) is there between different levels of General English (GE) and students' initial mindset rate and type) and the third one (i.e., What relationship (if any) is there between different levels of General English (GE) and the rate of change induced on their Growth Mindset levels through using gamified and interactive content) were analysed using two tests of analysis of variance,

(i.e., ANOVA), since it was the difference in score between pre-test and post-test, with respect to students' level of GE that mattered.

Results and Findings

As stated earlier, the major research question and the purpose of the present study was to investigate whether there existed any relationship between different levels of General English (GE) and the rate of change induced on learners' Growth Mindset levels when using gamified and interactive content, as well as with students' initial mindset levels. After accomplishing the data collection process successfully and gathering the data from both groups through the Mindset questionnaire and tests, the researchers analysed the data (using SPSS). The descriptive results of the analysis, using two types of descriptive statistics,

frequency and percentage are described in Table 1 (below).

Based on Table 1 above, in both Experimental and Control groups, there were more students in the Pre-A1 group than the A1 group, and in the A1 group than A2 and above, respectively.

The Experimental group's means and standard deviations show a change between the scores obtained in pre-test and those obtained in post-test of both mindset questionnaires. As can be seen in Table 2 below. The control group, however, does not show significant changes in these scores.

After assuring several assumptions: normality, equality of variances, equality of variance-covariance matrices and homogeneity of regression slopes, a MANCOVA was conducted to determine if the control and experimental groups' mindset has changed significantly (Table 3).

Table 1: Experimental and Control Groups Students Frequency and Percentage in General English Levels

			Level of General English			Total
			Pre-A1	A1	A2	
Student Groups	**Experimental**	Count	40	36	35	111
		% within group	36.0%	32.4%	31.5%	100.0%
	Control	Count	45	38	31	114
		% within group	39.5%	33.3%	27.2%	100.0%
Total		Count	85	74	66	225
		% within group	37.8%	32.9%	29.3%	100.0%

Table 2: Control and Experimental Groups Mean and Standard Deviation of the Scores of Mindset Questionnaires

Student Groups		Mindset Pre-test Questionnaire	Mindset Post-test Questionnaire
Experimental	Mean	45.513	52.459
	Std. Deviation	16.186	14.757
	N	111	111
Control	Mean	44.131	44.017
	Std. Deviation	16.178	16.234
	N	114	114
Total	Mean	44.813	48.182
	Std. Deviation	16.161	16.056
	N	225	225

Table 3: MANCOVA of Experimental and Control Students' Mindset Based on Using or Not Using Moodle (n = 225)

Source	Sum of Squares	Df	Mean Square	F	Sig.	Eta Squared	Statistical Power
Mindset Pre-test	24140.21	1	24140.21	1126.67	0.001		
Group	3054.35	1	3054.35	142.55	0.001	0.39	0.99
Error	4713.72	220	21.42				
Corrected Total	57747.52	224					

Having eliminated the probable effect of pre-test and taken some error (individual differences) into account, the results of the MANCOVA used for responding to this question show that due to the little significance (sig = 0.001) of the moderator variable (Mindset Pre-test), which is less than 0.05 error, the assumption of linearity of regression of the covariate and dependent variable is correct.

Thus, the main aim of the study is achieved and one can say that the independent variable (i.e., using gamified and H5P content) can influence mindset growth by 39% in Iranian EFL learners at the high school level. Statistical power is reported to be 0.99, which means the possibility of a Type I Error is 0.01.

To achieve the first subsidiary aim and discover whether different levels of General English (GE) have any relationship with students' rate of change induced through using gamified and H5P content on their Growth Mindset levels, the statistical analysis of ANOVA needed to be conducted and therefore, Levene's F-Test (Table 4) was used primarily.

Table 4: Test of Homogeneity of Variances (n = 111)

Levene's Statistic	df1	df2	Sig.
.817	2	108	.445

Since the result of the test of homogeneity was greater than 0.05, conducting an ANOVA was possible.

According to ANOVA results shown in Table 5, since F = 21.81, df = 2, 110, P = 0.001 and therefore significance is smaller than the 0.05 error, one can say that students' level of General English and the amount of mindset change are related. In order to compare the GE levels two by two, a Scheffe test was used.

Based on the result of the Scheffe test shown in Table 6 it can be deduced that mindset differences mean for Pre-A1 (p = 0.001), A1 (p = 0.001) and A2 and above (p = 0.025) are all significant. Comparing the mindset differences means between the three groups, it can be inferred, however, that the Pre-A1 group is the highest in mindset differences mean, while A2 is the lowest. In other words, the weaker the students' level of GE, the higher the amount of change in their mindset type towards a growth one.

Table 5: ANOVA for the Amount of Mindset Change Based on Students' Level of General English (n = 111)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1539.204	2	769.602	21.813	.000
Within Groups	3810.471	108	35.282		
Total	5349.676	110			

Table 6: Scheffe Test Results for Comparing Mindset Differences Mean and General English Levels

	GE Level	Pre-A1	A1	A2 and Above	Mindset Differences Mean
Mindset Change	**Pre-A1**	---	0.001**	0.001**	**11.45**
	A1	0.001**	---	0.025*	**6.33**
	A2 and above	0.001**	0.025*	---	**2.42**

For accomplishing the final subsidiary aim and determine whether different levels of General English (GE) have any relationship with students' initial mindset an ANOVA (as shown in Table 8) was required. Thus, Levene's F-Test was primarily conducted as presented in Table 7.

Table 7: Test of Homogeneity of Variances (n = 225)

	Levene's Statistic	df1	df2	Sig.
Mindset Pre-test	.052	2	222	.949

The result of the test of homogeneity is greater than 0.05, thus an ANOVA was conducted.

In order to inspect the difference between mindset mean scores of each GE level, a one-way ANOVA was used, with the results F = 55.62, df = 2, 222, P = 0.001, which is smaller than 0.05 error. Therefore, it can be claimed that students' GE level and initial mindset levels are related.

For comparing the GE levels two by two, a Scheffe test was conducted regarding initial mindset means as schematized in Table 9.

Based on the Scheffe Table above, it can be deduced that the difference between means of initial mindset levels for Pre-A1 (p = 0.001), A1 (p = 0.001) and A2 (p = 0.001) are significant. Furthermore, the highest initial mean of mindset levels belongs to those with better GE that is A2 and above, and the lowest, to those with weaker GE levels (i.e., Pre-A1).

Table 8: ANOVA for Primary Mindset Levels Based on Students' Level of General English (n = 225)

		Sum of Squares	df	Mean Square	F	Sig.
Mindset Pre-test	**Between Groups**	19531.006	2	9765.503	55.627	.000
	Within Groups	38973.154	222	175.555		
	Total	58504.160	224			

Table 9: Scheffe Test Results for Comparing Initial levels of Mean Mindset with General English Levels (n = 225)

	General English	Pre-A1	A1	A2	Mindset Mean
Mindset	**Pre-A1**	---	0.001**	0.001**	33.62
	A1	0.001**	---	0.001**	47.67
	A2	0.001**	0.001**	---	56.01

Discussion

The findings of the present study showed that the use of gamified interactive content (H5P) in the bichronous format of the LMS can have a significant effect on improving high school EFL learners' Growth Mindset levels by 39%. This result is in line with views of certain scholars, who will be referred to below. Moreover, the findings were in contrast with views of certain other scholars [11, 25] since their research studies on the effect of gamification on psychological experiences yielded mixed results [11, 25].

As said above, the asynchronous and synchronous modalities of LMS improved Growth Mindset of the experimental group students in the virtual classes, which were concern of this study. The finding is in agreement with views of a number of scholars [26-28].

The contents, which were provided for students in both gamified and H5P classes, resulted in immediate feedback exchanges, which raised the motivational level and encouraged them to go on with different interactive tasks and activities. This finding is in agreement with the belief of Ibrahim et al. [24] who believed that the immediate feedback in such classes made students motivated and encouraged them to get involved in different activities.

Since the only difference between experimental and control groups was using gamified interactive content for receiving the teaching instructions, what the results suggest is that through using such content, psychological components such as learners' mindset towards learning can be boosted positively. The reason why could be the motivational affordances provided by the gamification, increasing user engagement, essentially getting them more involved in this

gamified learning experienced [41], and the students getting into what Gee called the cycle of expertise [42].

If we consider Fogg's Behaviour Model (FBM), this change becomes clearer. FBM claimed behaviour to be the result of a concurrence of a. motivation, b. ability, and c. trigger [42]. In using gamified interactive content, the fun, game-like experience provided a degree of motivation for the students, and the step-by-step format, giving feedback and allowing retries, ensured students' ability to go through the lessons due to its simplicity. Regarding the trigger, learners' logs showed interesting themes. Some students did not seem to need any triggers. Those were the ones who generally finished their tasks right when they were available. Others generally seemed triggered by the fact that they had their synchronous session the day after since their logs showed them to use the website a day before their synchronous session. The compilation of these three factors, motivation, ability, and trigger could be the reason why the students were inclined to use the gamified interactive contents and learn better.

Furthermore, the different levels and the progress bar provided learners with a sense of achievement and unlike traditional learning, learners were able to retry each task and activity several times until they managed to get their desired score. Moreover, achievement probably seemed more attainable for weaker students, since they could refer to the taught materials during the lesson if they wanted to, in order to remember the points taught, which is unlike what happens in classes (and the control group), since the questions the teacher asks during the lesson and the mini-tasks that they assign during the class period cannot be paused in order for the learner to review the teaching instruction they have just received.

These features provided by the gamified interactive content allowed for a shift away from the fixed mindset where the students believed they simply do not have the talent and intelligence required in order to learn English and are incapable of changing that no matter how much they try, towards a Growth Mindset. The challenge they had to face was not as impossible to overcome, failure did not result in shame and they were allowed to redeem their name by trying again, the situation seemed less appalling as the design looks more like a game than a serious classroom, and progress was visible to them in the forms of the levels and progress bars. Suddenly, they were not as stupid in English as they once thought.

As this study focused on blending the asynchronous aspect of e-teaching platforms with the synchronous one, comparing it to its mere synchronous counterpart as the control group, the results showed that the bichronous use of the LMS in itself might not be effective in shifting learners' mindsets towards a growth one unless the features of synchronous and asynchronous modalities are used to their best. Therefore, it can be deduced that not every mode of using technology in its synchronous and asynchronous format results in a higher Growth Mindset.

As a subsidiary aim, this study intended to discover whether different levels of General English (GE) have any relationship with the rate of change induced through using gamified and H5P interactions on learners' Growth Mindset levels. Comparing the mindset differences means between the three groups, the results showed a difference between the three levels of English investigated in the current study, and it was deduced that the Pre-A1 group whose proficiency was below their grade level was the highest in its mindset differences mean and those in the A2 and above group whose proficiency was above their grade level,

experienced the least change. In other words, the weaker the students' level of GE, the higher the amount of change in their Mindset type towards a growth one. A reason why could be the fact that weaker learners had not been successful in their English learning previous to taking the course, thus forming a fixed mindset about their lack of ability, talent and intelligence regarding learning English. Therefore, after succeeding in learning English better, their view on this matter shifted, possibly realising they are not without talent, but either have not been working hard enough or going down the right path. Further affirming this point there were some students in the A2 level with average to high Growth Mindsets, who showed almost no difference in their mindset levels.

Another interesting point worth mentioning is the lack of change in the fixed mindset of a minuscule number of students in the A2 and above GE level. An explanation for this might be that these students see themselves as talented in learning English and therefore, progressing in their LMS based course did not relate to hardworking for them, but was a result of their talent and intelligence. This is in line with Dweck's work [31] since she explained that having a fixed mindset is not always specific to students' lack of success in an area.

Lastly, it can also be deduced from the results that the highest initial mean of mindset levels belongs to those with better GE (i.e., A2 and above) and the lowest, to those with weaker GE levels (i.e., Pre-A1). It can be explained that since weaker students had not been successful in their English learning and their exams before taking the course, they had formed a fixed mindset about their lack of ability, talent and intelligence regarding learning English. However, as mentioned hitherto, this was not the case for all the higher

GE level students and though the majority of these students had high Growth Mindset rates, there were those with high fixed mindset rates among them, which is due to their belief in their innate language-learning talent.

Conclusions

In conclusion, this study found that using gamified interactive content in a bichronous use of the LMS can indeed have a positive effect on increasing learners' Growth Mindset especially for those learners with GE levels lower than their grade level. Furthermore, it found that learners' level of GE is related to students' initial rate of mindset, with higher levels of GE pertaining to higher initial Growth Mindset status.

This study can provide researchers in the field of e-teaching with practical information on the benefits of using gamified interactive content in using asynchronous and bichronous LMS based courses. It can also provide teachers with some guideline on how to increase the weaker learners' mindset levels shedding some light on the positive effects of the application of gamified content such as H5P in e-learning on making some changes in the students, their learning style, and their psychological experiences. It is also noteworthy that not every mode of using technology in its synchronous and asynchronous format can necessarily increase Growth Mindset.

The results on the relationship between students' level of GE and their initial rates of mindset can contribute to the concept of growth and fixed mindset, showing a possible relationship between learners' proficiency and their mindset levels. Furthermore, the effect of using gamified interactive content in e-learning on fostering Growth Mindset in learners can assist them in growing into more successful learners, as well as aid teachers in helping their students learn their lessons without necessarily being talented in that area.

Last but not least, this study can help policymakers see the effect the application of the gamification and H5P plugins has on teaching English and can possibly have on other subjects, which can result in new curriculums for schools, grounded on H5P based teaching rather than live teaching using merely web conferencing or messenger apps such as Shad (as a local Iranian platform).

In this study, the researchers faced a number of limitations, which are hoped will not exist for future researchers. One of the limitations was limited subjects available for the research. The only instrument for collection of data in this research was questionnaire. The working conditions and some personal problems, which avoided the teacher to be fully at service of the research should be considered other sources of limitation.

Authors' Contribution

Acknowledgments

Conflicts of Interest

The authors have no conflicts of interest.

References

[1] DeCoito I. The use of digital technologies to enhance learners' conceptions of nature of science. Nature of Science in Science Instruction: Rationales and Strategies. 2020:343-57.
DOI: https://doi.org/10.1007/978-3-030-57239-6_19

[2] DeCoito I, Briona LK. Fostering an entrepreneurial mindset through project-based learning and digital technologies in STEM teacher education. InEnhancing entrepreneurial mindsets through STEM education 2023 Jan 2 (pp. 195-222). Cham: Springer International Publishing.
DOI: https://doi.org/10.1007/978-3-031-17816-0_9

[3] Goethe O, Goethe O. Technology Impact Mindsets. Gamification Mindset. 2019:1-1.
DOI: https://doi.org/10.1007/978-3-030-11078-9_1

[4] Harismayanti I, Putra IN, Santosa MH. Gamification in English Teaching and Learning. Nilacakra; 2020 Nov 1.

[5] Hodent, C. Discovering the mindset for creating successful products. CRC Press/Taylor & Francis Group; 2022.

[6] Scott S, Niemand T, Kraus S, Oberreiner R. Let the games begin: finding the nascent entrepreneurial mindset of video gamers; 2020. Proceedings of the 53rd Hawaii International Conference on System Sciences.

[7] Ting YS, Yeh YC. Growth-mindset intervention effects and the relationship of mindset, hope belief, and self-efficacy during creativity game-based learning. Interactive Learning Environments. 2023 Feb 15:1-7.
DOI: 10.1080/10494820.2023.2170418

[8] Yeh YC, Ting YS. Comparisons of creativity performance and learning effects through digital game-based creativity learning between elementary school children in rural and urban areas. British Journal of Educational Psychology. 2023 Mar 1:e12594, 93(3): 790-805.
DOI: https://doi.org/10.1111/bjep.12594

[9] Mansouri, T. and Saeedi, Z. (2019). The Efficiency of Technology and Educational Software in Learning Foreign Language Vocabulary. Language Sciences; 2019. 5(8): 189-220.
Doi: 10.22054/ls.2019.32479.1118

[10] Marty F. Reflections on the use of computers in second-language acqusition—I. System; 1981 Jan 1;9(2):85-98.
https://doi.org/10.1016/0346-251X(81)90023-3

[11] Inchamnan W, Chomsuan J. Gamification Workflow for Growth Mindset Processes. In 2020 18th International Conference on ICT and Knowledge Engineering (ICT&KE) 2020 Nov 18 (pp. 1-6). IEEE.

[12] Kazakoff E, Mitchell A. Cultivating a growth mindset with educational technology. Lexia. Retrieved (25.04. 2018)

[13] Reinhardt KS, Elwood S. Promising practices in online training and support: Microlearning and personal learning environments to promote a growth mindset in learners. In Handbook of research on virtual training and mentoring of online instructors 2019 (pp. 298-310). IGI Global.

[14] Deci EL, Ryan RM. Self-determination theory: A macrotheory of human motivation, development, and health. Canadian psychology/Psychologie canadienne. 2008 Aug; 49(3):182.
https://doi.org/10.1037/a0012801

[15] Beatty K. Teaching & researching: Computer-assisted language learning. Routledge; 2013 Nov 4.

[16] Ellis RK. Field guide to learning management systems. ASTD learning circuits. 2009 Aug:1-8.

[17] Hyder, K, et al. *The eLearning Guild's Handbook on Synchronous e-Learning*. The eLearning Guild, ed. B. Brandon; 2007: David Holcombe.

[18] Martin F, Polly D, Ritzhaupt A. Bichronous online learning: Blending asynchronous and synchronous online learning. Educause Review. 2020 Sep 8; 8. Available from:

[19] Terrill, B. *My coverage of lobby of the social gaming summit.* Bret on social games; 2008.

[20] Welbers K, Konijn EA, Burgers C, De Vaate AB, Eden A, Brugman BC. Gamification as a tool for engaging student learning: A field experiment with a gamified app. E-learning and Digital Media. 2019 Mar;16(2):92-109.
https://doi.org/10.1177/2042753018818342

[21] Simões J, Redondo R, Vilas A, Aguiar A. Using gamification to improve participation in social learning environments. Learning and Diversity in the Cities of the Future. 2015:169-86.

[22] Huotari K, Hamari J. Defining gamification: a service marketing perspective. In Proceeding of the 16th international academic MindTrek conference 2012 Oct 3 (pp. 17-22).

[23] Deterding S, Dixon D, Khaled R, Nacke L. From game design elements to gamefulness: defining" gamification". In Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments 2011 Sep 28 (pp. 9-15).

[24] Ibrahim FI, Hassan N, Fun TL. ENHANCING STUDENTS'EXPERIENCE WITH H5P LEARNING ACTIVITIES DEVELOPED ACCORDING TO TRIPLE E FRAMEWORK (ENGAGE, ENHANCE & EXTEND). UNIVERSITY CARNIVAL ON E-LEARNING (IUCEL) 2019. 2019:26.

[25] Hamari J, Koivisto J, Sarsa H. Does gamification work?--a literature review of empirical studies on gamification. In 2014 47th Hawaii international conference on system sciences 2014 Jan 6 (pp. 3025-3034). Ieee.

[26] Blake R. Distance education for second and foreign language learning. Language, Education and Technology. Encyclopedia of Language and Education. 2017:157-68.

[27] Ko MH. Learner perspectives regarding device type in technology-assisted language learning. Computer Assisted Language Learning. 2017 Nov 17;30(8):844-63. https://doi.org/10.1080/09588221.2017.1367310

[28] Naismith L, Sharples M, Vavoula G, Lonsdale P. Literature review in mobile technologies and learning; 2004, hal-00190143.

[29] Amir B, Ralph P. Proposing a theory of gamification effectiveness. In Companion proceedings of the 36th international conference on software engineering 2014 May 31 (pp. 626-627).

[30] Wicaksono JA, Setiarini RB, Ikeda O, Novawan A. The use of H5P in teaching English. In The First International Conference on Social Science, Humanity, and Public Health (ICOSHIP 2020) 2021 Jan 2 (pp. 227-230). Atlantis Press.

[31] Dweck C. Mindset-updated edition: Changing the way you think to fulfil your potential. Hachette UK; 2017 Jan 12.

[32] Blackwell LS, Trzesniewski KH, Dweck CS. Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. Child development. 2007 Jan; 78(1): 246-63. https://doi.org/10.1111/j.1467-8624.2007.00995.x

[33] Campbell AL, Direito I, Mokhithi M. Developing growth mindsets in engineering students: a systematic literature review of interventions. European Journal of Engineering Education. 2021 Jul 4;46(4):503-27. https://doi.org/10.1080/03043797.2021.1903835

[34] Hochanadel A, Finamore D. Fixed and growth mindset in education and how grit helps students persist in the face of adversity. Journal of International Education Research (JIER). 2015 Jan 26;11(1):47-50. https://doi.org/10.19030/jier.v11i1.9099

[35] Rhew E, Piro JS, Goolkasian P, Cosentino P. The effects of a growth mindset on self-efficacy and motivation. Cogent Education. 2018 Jan 1;5(1):1492337. https://doi.org/10.1080/2331186X.2018.1492337

[36] Rissanen I, Kuusisto E, Tuominen M, Tirri K. In search of a growth mindset pedagogy: A case study of one teacher's classroom practices in a Finnish elementary school. Teaching and teacher education. 2019 Jan 1;77:204-13. https://doi.org/10.1016/j.tate.2018.10.002

[37] Saunders SA. The impact of a growth mindset intervention on the reading achievement of at-risk adolescent students. University of Virginia; 2013.

[38] Dweck CS. Mindset: The new psychology of success. Random house; 2006 Feb 28.

[39] Smith M, Firth J. Psychology in the Classroom: A Teacher's Guide to what Works. Routledge; 2018 Jan 31.

[40] Seligman ME. Helplessness: On depression, development, and health. WH Freeman; 1975.

[41] Muntean CI. Raising engagement in e-learning through gamification. In Proc. 6th international conference on virtual learning ICVL 2011 Oct 29 (Vol. 1, pp. 323-329).

[42] Gee JP. What video games have to teach us about learning and literacy. Computers in entertainment (CIE). 2003 Oct 1;1(1):20. https://doi.org/10.1145/950566.950595

[43] Fogg BJ. A behavior model for persuasive design. In Proceedings of the 4th international Conference on Persuasive Technology 2009 Apr 26 (pp. 1-7).

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