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Gamification and Gen Z in Higher Education:
A Systematic Review of Literature

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ABSTRACT

Research has found that the new age learner, Gen Z, is different from his/her predecessors, and hence, educators need new age pedagogical interventions to cater to this group of learners. With a change in the way the new age learner learns, the education system needs to revamp to incorporate tools that suit the needs of the learner. The paper reviews the use of gamification as a tool for motivation and engagement for Gen Z in higher education with the help of peer-reviewed research literature from research databases predominantly from Scopus and Web of Science. The purpose of this paper is to provide suggestions on how to create an engaging and meaningful learning environment in higher education for Gen Z by providing relevant insights on gamification with the help of secondary research. As this is an emerging field of study, this paper will help policymakers, educators, and academicians to design and implement relevant interventions to use gamification as an effective tool for Gen Z learners in the field of higher education.

KEYWORDS

Gamification, Gen Z, Higher Education, Literature Review

1. INTRODUCTION

Digital Natives (Prensky, 2001) comprise a large chunk of students currently entering college (Seemiller & Grace, 2016). The purpose of education is to create a generation that adds value through its existence. Volatility in the industry environment leads to changes in what is required to be delivered to the students in terms of education. Does whatever gets taught get assimilated? Probably this depends mainly on the way it is delivered. This is where the 'How' part of education plays an important role. More so, when the future generation is nowhere close to a reflection of its past. With generations changing, one cannot maintain the same ways of teaching. This has intrigued researchers to decipher how students' motivation and engagement influence their learning, especially with the help of technology in areas like lecture content, evaluations, exams, etc. Gamification and educational games support the development of students' motivational, cognitive, social, and emotional outlook (Licorish, Owen, Daniel, & George, 2018).Not much work to date has focused exclusively on Higher

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Education, despite the availability of literature on gamification and its effects (Ortiz, Chiluiza, & Valcke, 4th-6th July 2016). This paper aims to present the case of gamification through an analysis of the practice of gamification drawn from a range of worldwide examples to help policymakers, educators and academicians to design and implement relevant interventions to use it as an effective tool for Gen Z learners in higher education. The teaching approaches of the 20th century do not gel with the requirements of the Z generation, born in the 21st century into a digital and technology-dominated world, thus creating concerns in the field of education. The introduction of gamification could lend some solution to this as for Gen Z gamification technology is part of their daily routine. Gamification encourages learning using applications but hardly a few articles mention its impact on learning (Varannai, Sasvari, & Urbanovics, 2017).

This paper attempts to explore the prospects of using gamification in education as a mode to increase student engagement and motivation. The following sections of this paper have been organized in a manner that addresses the characteristics and needs of Generation Z; and characteristics of and experiences with gamification with the help of existing literature. Based on this, research questions were identified and methodology devised to accomplish the same. The findings have been discussed to understand ways how different types of higher education institutes could cater to the needs of Generation Z through the adoption of gamification. The section on the conclusion makes a case for gamification in higher education for Gen Z. Even though the limitations of the study have been stated, as future scope of the paper, researchers may like to develop a conceptual framework or theory on gamification or gamification theory as applied in higher education and do an empirical test for the same.

2. REVIEW OF LITERATURE

The first decade of the 21st century is witnessing the entry of Generation Z in tertiary education requiring adaptive learning methods both at the university level and workplaces. This generation is better equipped with technology than their teachers who belong to Generation X (referred to as technology migrants), thus prompting alteration in every aspect of the existing teaching-learning environment (Cilliers, 21st January 2017). A large number of people playing Pokemon Go which introduced the blending of physical and virtual spaces indicates the changing societal needs where the digital world and smartphones promise to be a game-changer (Lopez, 2016).

2.1. Generation Z

They are often labelled as Digital Natives and resort to Google to understand the world but are desirous of an education that helps them for a career (Mohr & Mohr, 2017). Generation Z (Tapscott, 2009) has been defined as people born between the mid-1990s to early 2010s and hence belongs to the age group between 10 to 25 years old as of 2020. They enjoy using their devices to solve puzzles or interpret GPS or QR codes (Rusu & Cureteanu, 2009) .This tech native Generation Z (dubbed as Gen Z or iGen) which is at present a part of the whole education system across the world, is slated to be the largest workforce (61 million strong workers accustomed to internet, use of social communication since birth) in the next few years. Research illustrates that the brains of Generation Z are architecturally different more due to the external environment than due to genetics. Brain section responsible for visual ability is far more advanced, making pictorial forms of learning like joint projects and interactive games more receptive than auditory learning including lectures (Rothman, 2016) (Cilliers, 21st January 2017).Various researchers have penned down the importance of student engagement as a precursor to student learning and participation but some still consider it as one of the major problems faced by educational institutes today be it behavioural (attendance and assignment completion) or cognitive (thinking and understanding of the topics) and to solve these issues, educators have experimented with digital games as alternate methods to engage students through their development and design can be quite expensive as far as time and money are concerned (Hew, Huang, Chu, & Chiu, 2016). Hence, instead of full-fledged implementation of digital games use of gamification, a strategy that

uses game mechanics for user engagement in real-world non-game contexts, is prescribed by some researchers (Deterding, Dixon, Khaled, & Nacke, September 2011).

Most current university faculty members are Boomers and Generation-Xers and are teaching Gen Y and Z. This divide presents an opportunity to understand the current students and their needs as learners. Thus, Seemiller and Grace (2016) suggest that the framing of assignments is very important today. Faculty will need to consider generational variances that hamper or aid teaching-learning and retort proactively (Mohr & Mohr, 2017). All the more when almost 26% of the US and 27% of the global population are now Generation Z, the first to be born into a digital world, raised in a hyper-connected world with a plethora of information and on-demand culture (Hampton & Keys, 2017). In the same paper many researchers have corroborated the following characteristics of Gen Z: Spends around 15.4 hours per week on their smartphones which are always in their possession; has an average attention duration of 8 seconds, may expect prompt feedback, communicates in short spurts of information in place of long messages, Facebook, Twitter, blogs, personal websites, social gaming, etc. are methods of mass communication and sharing information, prefers learning from the internet and through listening rather than reading (Hampton & Keys, 2017). They are more visually focused and like to use pictures/images in their messages (Venter & Myburgh, November 2018).

Students' engagement has been defined as activities performed either mentally or physically by them in their search of knowledge (Rahman, Ahmad, & Hashim, January 2019). Models such as e-learning and MOOC by themselves do not remove challenges like learners' motivation and engagement, dropout, etc. Students believe that the gamification of courses can impact motivation and learning achievements (Rajšp, Beranič, Heričko, & Horng-Jyh, September 27-29, 2017). Factors like motivation, engagement, effectiveness, and efficiency of students can be upgraded because of gamification (Urh, Vukovic, Jereb, & Pintar, 2015). Gamification is characterized by group-based motivation and feedback process as its bases are social networks that can help raise the level of engagement in the learning process for every individual (Bíró, 2014).Students have been classified based on their motivation during gaming as Socializers, Achievers, Killers, and Explorers according to Bartle's taxonomy (Iosup & Epema, March 2014)

2.2. Gamification

Gamification in education has focused on a set of rules and processes, participant involvement, and culture-specific role models to enhance learners' behaviour (Su & Cheng, 2013). Researchers in (Lee & Hammer, 2011) discussed millions of gamers getting hooked on voluntarily for hours to video games and the virtual world like Farmville, World of Warcraft to develop their problem-solving skills and individual abilities such as perseverance, imagination, and toughness within the context of games through extended play because of their engaging aspects. Features like grades (badges), a reward for required and punishment for unwanted behaviours are an inherent part of a school system but the classroom-based activities do not come across as playful experiences thus the existence of game-like elements does not impact engagement. The school environment results in negative outcomes such as lack of interest, adopting unethical means, and in few cases leaving school. In the educational sector in the United States, motivation and engagement are the biggest challenges that aim to be tackled through gamification, (Bridgeland, Dilulio, & Morison, 2006).

The standard pedagogy and methodology used in education are outdated which results in a lack of interest, enthusiasm, and participation. The key element of fun is missing. Gamification provides educators with tools to enhance engagement, motivation, and learning. Examples of few simple Gamified Systems are "Codecademy, Khan Academy, Duolingo" and certain complex ones are "Foldit, Classcraft, CodeCombat" (Damsa & Fromann, 2016). Games offer a meaningful and stimulating experience. The methodology of creating this element in processes is called "gamification" (Cheong, Filippou, & Cheong, Fall 2014). Games usually focus on enjoyment and gratification. On the other hand, gamification focuses on meaningful interaction amongst various stakeholders which results in better understanding and resolving problems and leads to win-win solutions (Xu, Buhalis,

& Weber, 2017).The literature on theories of learning mentions the role of creativity and playfulness; the consequence of learning step-by-step and advantage of reward and recognition in comparison to punishment (Skinner, 1968) in (Biro, 24-26 April, 2013).

Bedwell taxonomy defines gamification as a process where game-related attributes are used to influence learner related action or outlook. This process is further moderated by outcomes and mediated by learning. (Landers, 2015). A lot of prior researchers studied the strong appeal of video games as game-based learning and have tried to apply the same in education to enhance learner interaction and participation. The studies helped in the creation and classification of thirty-six learning principles about video games which could be used to enhance learning. A few of the identified principles were instant feedback, self-learning, on-demand information, team collaboration (Borys & Laskowski, 19-21 June 2013). Some successful gamification examples from the education sector are Khan Academy, Treehouse, Udemy and Duolingo that have used interactive content, created a large database of topic wise videos and have devised novel mechanisms of tracking student progress with the help of badges and points (Fotaris, Mastoras, Leinfellner, & Rosunally, 2016). The majority of the available literature on gamification is from the field of computer science which has used tools such as Codeacademy which focusses on e-learning and Kahoot which is a fun based game learning (Fies & Marshall, 2006).One study applied action design research principles to teach a postgraduate data warehouse/business intelligence module differently, to better engage the latest generation (generation Z) so that their unique educational needs can effectively be catered to (Venter & Myburgh, November 2018).

Gamification in learning uses three norms designed from the Self-Determination Theory. The theory analyses the rationale behind the choices exercised by people without external influence (Ryan and Deci, 2000):

Affiliation – basic need to communicate and associate with others;
Capability – basic need to be efficient and solve a problem in a given situation;
Independence – basic need to take charge of self

Game mechanics generally involves points, badges, and leader boards (Hew, Huang, Chu, & Chiu, 2016). These game elements have an influence on both extrinsic and intrinsic motivation of students which affects student involvement and participation (Deterding, Dixon, Khaled, & Nacke, September 2011). By bringing in an element of enjoyment and fun into learning and in doing the learning activity assessment part would be attained (Iosup & Epema, March 2014). The wide use of gamification has been witnessed in education applications, health industry, business training, marketing campaign, and tourism (Xu, Buhalis, & Weber, 2017). The need to tackle this Gen Z differently has also been recognized by industries like tourism which tries to address the requirements of this novel group of consumers who look for excitement act, online and often gamified tourism events involving puzzle-solving and surmounting physical barriers (Skinner, Sarpong, & White, 2018). For example, geocaching (employ GPS technology to locate hidden treasure) used in tourism is often labelled as an enhanced digital form of treasure hunt, or hide and seek (Cord, Roeßiger, & Schwarz, 2015) (Ihamäki, 2012). Games like PokemonGo sent the generation in a tizzy. Gamification is gaining acceptance to drive higher interest and engagement amongst users. Most of the prior research has focused on user perceptions and many experimental studies did not have control groups. Traditionally the field of computer science has been a pioneer in gamification involving samples mainly from Europe or North America (Iosup & Epema, March 2014).

Presently the research on gamification in education is in its embryonic stages where stakeholders are trying to map the various game elements to enhance the success of learning (Iosup & Epema, March 2014).

Table 1. Total papers retrieved source-wise

S.No.	Database	Number of results (after removing duplication)
1	Scopus	21
2	Web of Science	Already covered in Scopus
3	Google Scholar	8
4	Academia.edu	0
5	Research Gate	Already covered in Scopus
	Total	29

3. RESEARCH OBJECTIVES

In light of the above vagaries in the learning patterns of the new generation, this paper is relevant to the education sector. The authors would like to explore how gamification is being used in various areas of education (teaching concept, assessment, etc.), in what fields, how and in what countries across the globe as mainly reported in the literature and how does it respond to the learning requirements of Gen Z.

This paper strives to address how one can make the learning process more interesting for Gen Z by the use of gamification. Based on the Literature review the authors intend to address the below-mentioned research questions:

Q1. Which countries and which fields of higher education have experimented with gamification?
Q2. What gamification elements have been used in Higher Education?
Q3. Which variables have gamification impacted and how?
Q4. Does gamification address Gen Z requirements and How?

4. METHODOLOGY

There is hardly any literature available that talks about gamification in higher education for Gen Z. Hence, we tried to find studies that mentioned the use of gamification in education from a broad to a specific perspective. More recently, vivid definitions have made way, and links between gamification and motivation, engagement, and learning outcomes are being stressed.

The literature search and review was done in late 2019 and early 2020 with the help of the following fundamental methodological steps (Rickinson & May, October 2009): scoping, selecting, searching, analyzing, synthesizing and reporting. Scoping helped in a) deciding the search string <gamif*> (gamify, gamified, gamification, etc) AND <higher education OR learning OR training> AND/OR <Gen Z> (generation Z); b) latitude of search (title, abstract); c) time duration (scientific works published after 2000). For maximum paper coverage, the three different channels targeted were: indexed databases of scientific publications (Scopus, Web of Science), the Web (the Google Scholar search engine), and academia-driven social networks (ResearchGate, Academia.org).

The above helped to obtain a more discriminatory and operational data set. The paper selected for analysis dealt with gamification in higher education as a core research concern. As there were very limited papers that had all the three including Gen Z the search was broadened to include papers that did not talk about Gen Z specifically. Table 1 depicts the number of records retrieved source-wise as per set criteria after removing duplicate titles.

The selection process resulted in 141 articles and irrelevant articles (focus on elementary and secondary, gamification used as a synonym for game-related topics such as video games, serious

Table 2. Criteria for Inclusion and Exclusion

S.No.	Criterion	Inclusion	Exclusion
1	Topic	Gamification as defined by Deterding et al Higher Education (HE); Gen Z	Gamification used as a synonym for game-related topics such as video games, serious games, etc
B	Educational Level	Higher Education	Other Settings different from HE (eg work, medicine, elementary school) or no specification about the educational level
3	Participants (Students/ Gen Z)	Undergraduate or graduate/ PG	Professors, managerial levels
4	Study focus	Empirical, theoretical or secondary research or lit review	N/A
5	Knowledge area	No specific area (STEM, medicine, IT, Business)	N/A
6	Other	N/A	Repeated article, no access due to payment required, not found.

games, etc.) were identified post abstract reading. Table 2 gives detailed criteria used for inclusion and exclusion.

5. FINDINGS AND DISCUSSIONS

Table 3 showcases the summary of the selected studies fitting the inclusion criteria. The table depicts as per the inclusion criteria the leading countries researching in the area, field of study, type of study, variables of the study , impact of study and the type of publication.

Figure 1 shows the annual distribution of papers mentioning gamification and gen Z and higher education. A total of twenty nine papers fitting the criteria of gamification, gen Z and higher education were identified. Its showcases that there is a gradual increase in the research output in this area. The first paper pertaining to this area was published in 2014 and steadily increased to ten in the year 2019. The graph indicates a lot of scope for research in this area.

RQ1) Which countries and which fields of higher education have experimented with gamification?

Among countries that have experimented with gamification as a concept in education, Europe & UK seem to be leading. The results of the studies have varied from positive impact to negative to mixed to neutral.

The graph in Figure 2 showcases the twenty-eight research papers pertaining to the area from across the globe . Spain and UK are the leading contributors. One additional paper which covered the ASEAN countries is also a part of the study but has not been showcased in the graph as the study was done in several countries.

In a recent study, gamification was used to present orientation information to university students. (Iosup & Epema, March 2014)

Figure 3 showcases the fields of higher education experimenting with gamification. The field of computer science followed by engineering and management are the highest contributors to this area. There is also an emerging interest in the topic of gamification from the fields of Arts and Humanities, Environmental Science and Psychology as depicted in Figure 3.

Table 3. Selected Studies

Paper No	Paper Title (2-3 words..)	Author (Year)	Country	Course Subject	Level & Duration of Study	Method	Sample Size (N)	Gamification Element	Variables	Publication (J-Journal / C-Conference/ T-Thesis)
1	An Experience Report ….	Iosup, A., & Epema, D. (2014, March)	Netherlands	Computer Organization & Cloud Computing	UG (3 years) & PG (1year)	Quantitative	450	Point systems; Levels and access, power; Leader boards; Badges; Onboarding;	Engagement; Motivation; participation, completion, assessments and satisfaction	C
2	Enhancing student learning….	Tsay, C. H. H., Kofinas, A., & Luo, J. (2018)	UK	Personal and Professional Development (PPD) 2: Business Communication and Research	UG (2 academic terms)	Experimental: control and experiment group	136	Essential Learning, Leaderboards and Super Learning badges	Performance; behavioural engagement; Attendance	J
3	Gamification in online….	Azmi, S., Iahad, N. A., & Ahmad, N. (2015).	Malaysia	Programming language & subjects under computer science	UG (Computers)	Review of Literature		Types: mechanics, dynamics, aesthetics	Participation and skill development. but does not consider the students' achievement; Assessment and Social Activity	J
4	Using Games….	Mladenović, S., Krpan, D., & Mladenović, M. (2016)	Croatia	Programming Technique	School & UG (3 years)	Mixed (Quantitative & Qualitative) Experimental-ctrl & Exp gps	510	Making Games	Attitude and motivation	J
5	Investigating the effects….	Huang, B., Hew, K. F., & Lo, C. K. (2019)	Hong Kong	Information Management course	UG	Quantitative (Exp-ctrl & Exp)	96	Games	Behavioural & cognitive Student Engagement, Timely submissions & Performance	J
6	Kahoot! It: ….	Tan Ai Lin, D., Ganapathy, M., & Kaur, M. (2018)	Malaysia	English for the Media	UG 1 semester (14 weeks)	Quantitative	51	Kahoot!	Motivation, Engagement, and Learning (for both theoretical and practical aspects)	J
7	Gamification in….	Ortiz Rojas, M. E., Chiluiza, K., & Valcke, M. (2017)	Belgium	Basic programming course by engineering students	6 weeks	Quantitative (pre and post-test with ctrl and exp)	100	badges and meta-badges (Code Academy or Schools)	learning performance, intrinsic motivation, self-efficacy, and engagement	C
8	Towards the Social…	De-Marcos, L., Garcia-Cabot, A., & Garcia-Lopez, E. (2017)	Spain	Basics of ICT	15-week UG	Quantitative	374	Leaderboard, Badges, points and the virtual shop	Motivation affordances (competence, autonomy, and relatedness); Performance; Attitude. No diff in participation	J
9	Higher education…	Galbis-Córdoba, A., Martí-Parreño, J., & Currás-Pérez, R. (2017)	(Spain)	Physiotherapy; Marketing; Criminology and Psychology; Odontology; Law; Languages and Intercultural Communication; International Relations; Architecture	UG	Quantitative	128	Must contain features a) which draw attention b) are balanced in terms of the level of difficulty and gaming competence c) be perceived as relevant	students' competencies	J

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Table 3. Continued

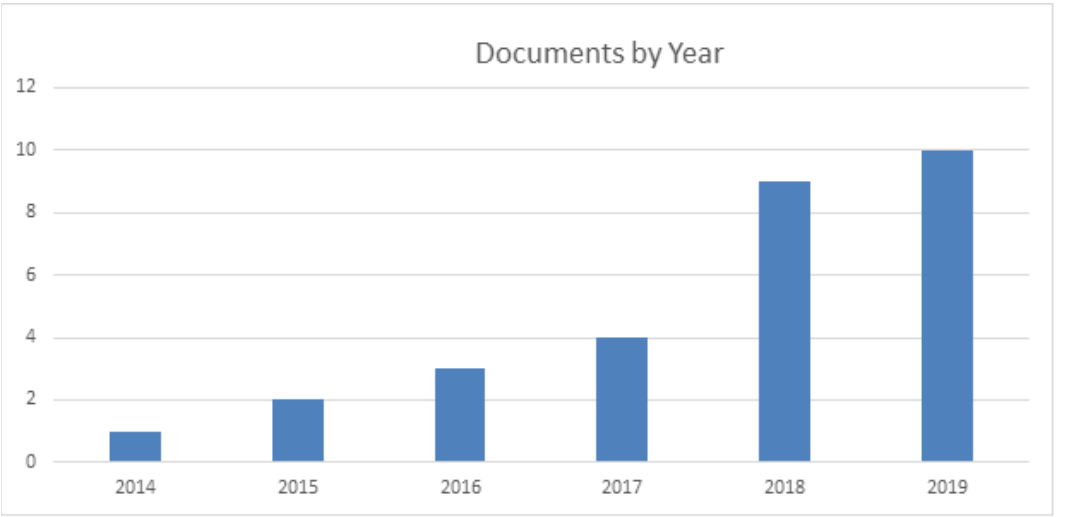
Paper No	Paper Title (2-3 words..)	Author (Year)	Country	Course Subject	Level & Duration of Study	Method	Sample Size (N)	Gamification Element	Variables	Publication (J-Journal / C-Conference/ T-Thesis)
10	A Systematic Review…	Borges, R. P., Oliveira, P. R. F., Lima, R. G. R., & Lima, R. W. (2018)	Brazil	Programming	UG	Systematic Review of Literature		mapping of published works in the last five years (2012 to 2016) in two of Brazil's leading scientific computing platforms (CEIE and RENOTE); Scratch	Motivation; Growing interest of researchers in this area	J
11	Fun and games…	Whitton, N., & Langan, M. (2019)	UK		UG	in-depth interviews	37	Fun learning experience: stimulating pedagogy; lecturer engagement; a safe learning space; shared experience; and a low-stress environment	Engagement and Satisfaction	J
12	Influence of online…	Turner, P. E., Johnston, E., Kebritchi, M., Evans, S., & Heflich, D. A. (2018)	USA	Math, English, Environmental Sc, Nutrition	Nontraditional students UG	An extensive literature review	77 articles	Games	Problem-solving skills; Critical-thinking; Cognitive (memory and reasoning); Success; Confidence; Satisfaction; Interest; Effort	J
13	The elements.	Limantara, N., Hidayanto, A. N., & Prabowo, H. (2019)	Indonesia	Computer Science Business Information Systems, Medical Information Technology, Instructional Technology & Media, Physiology, Psychology, Social Science, Animation and Game Design, Chemistry and Biotechnology, Educational Sciences, Engineering Information, Science, Law, Social Sciences		Secondary Lit Review	30 Research papers	Reward, Quest Points, Badges, Narrative Feedback, Competition, Publicity, Avatar, Card, Games, Task XP Ranking Level Leader board, Achievement, Quiz, Puzzle, Virtual Goods	Learning; Motivation; Engagement	J
14	Can learning.	Martín, J. L., Frias, Z., & Martínez, J. P. (2017, September)	Spain (No publication details)	Telecommunication Engineering	UG & PG	Quantitative	153	must contain features a) which draw attention b) are balanced in terms of the level of difficulty and gaming competence	developing Digital Competences; active learning	C
15	Undergraduate students' …	Pinna, G., Mena, J., & Funes, S. (2019, October).	Spain	Organizational Behaviour	UG	Quantitative	35	Kahoot	stimulating and motivating learning by promoting dynamism, fun, participation, and competitiveness in the classes.	C
16	Using a Gamification…..	Munogee, P., Moctaram, H., & Cadersaib, Z. (2019, September).	Mauritius	ERP	UG	Quantitative (pre & post test)	38	Odoo software	Motivation & Learning	C

continued on next page

Table 3. Continued

Paper No	Paper Title (2-3 words..)	Author (Year)	Country	Course Subject	Level & Duration of Study	Method	Sample Size (N)	Gamification Element	Variables	Publication (J-Journal / C-Conference/ T-Thesis)
17	Student's Perception……	Sarmila, M. S., Ramlee, S., Sabarudin, A., Arsad, N., Nor, M. M., Batcha, Z. K., ... & Nordin, A. I. (2019, November)	3 ASEAN countries namely Malaysia, Indonesia, and Vietnam	Entrepreneurship			209	Games institutions that provide necessary supports; instructors' abilities to deliver teaching materials in an engaging way and students' openness to learn entrepreneurship	better acceptance of entrepreneurial education courses.	C
18	Serious game…..	Júnior, E.S., Simão Monteiro, S.B., Madeira Campos, M.R.(2019)	Brazil	Production Engineering		Case Study		Games	motivation and engagement	C
19	Gamification in e-learning:….	Poondej, C., & Lerdpornkulrat, T. (2019).	Thailand	Information Literacy Skills course (e-learning)	UG		104	Games	satisfaction, motivating and engaging	J
20	Motivational Influences…..	Costello, R., & Lambert, M. (2019)	UK	Level 5 and Level 6 Games Technologies Development courses	UG	mixed-method data analysis		Games excitement and motivational	Retention, engagement, motivation, and problem solving	J
21	Simulations in project….	Stewart, I., Denholm, J., & Blackwell, P. (2016, October)	UK		PG			Games		C
22	Development and Evaluation….	K Mabuela, JO (2016)	South Africa	B Tech, Computer Science	Not Specified	Qualitative	10	Points, Games, rewards	Participation	C
23	Do accelerated…..	TR Berry - 2019	UK	BA (Hons) Advertising and BA (Hons) Public Relations	Two years	Quantitative	12	Not Clearly Specified, Work-Based learning & Experiential learning	Learning	T
24	Continuous assessment…….	A Yaldaie - 2018	Finland	Students working towards a Masters Degree (Course Not Specified)	Not Specified	Mixed	40	Badges, Points, Progress Bars, Levels	Motivation and Learning	T
25	Innovative Communication….	MS Madida, GM Naidoo, H Rugbeer - 2018	South Africa	School students, Course Not Specified	Six weeks	Mixed	121	Not Specified	Learning and Performance	T
26	Developing teaching….	HA Viviers - 2016	South Africa	B Com Students	Not Specified	Quantitative	164	Points, Race	Learning and Application	T
27	The strategic role…	MMS Bello - 2015	Portugal	Master Students	Eight weeks	Mixed	164	Not Specified	Learning	T
28	Blended learning….	SED Abou Zaid - 2017	Egypt	Not Specified	Not Specified	Qualitative	13	Not Specified	Learning	T
29	Towards the Development….	R Galstyan Sargsyan - 2019	Valencia, Spain	BEng in Mechanical Engineering, BSc in Computer; Science, BA in Business Management; English Language	Not Specified	Mixed	135	Gaming	Learning, Engagement	T

Figure 1. Yearly distribution of relevant papers (citing gamification and higher education and/or gen Z)



RQ2) What gamification elements have been used in Higher Education?

The system's context and purpose would define the usage of game mechanics or elements. Badges, points, leaderboards, levels, and feedbacks are the most frequently used elements in making learning content more interesting. This is necessitated due to the shifting profile of students today and is facilitated by the ubiquity of ICT (Table 4).

RQ3) Which variables have gamification impacted and how?

Figure 2. Papers by country of origin

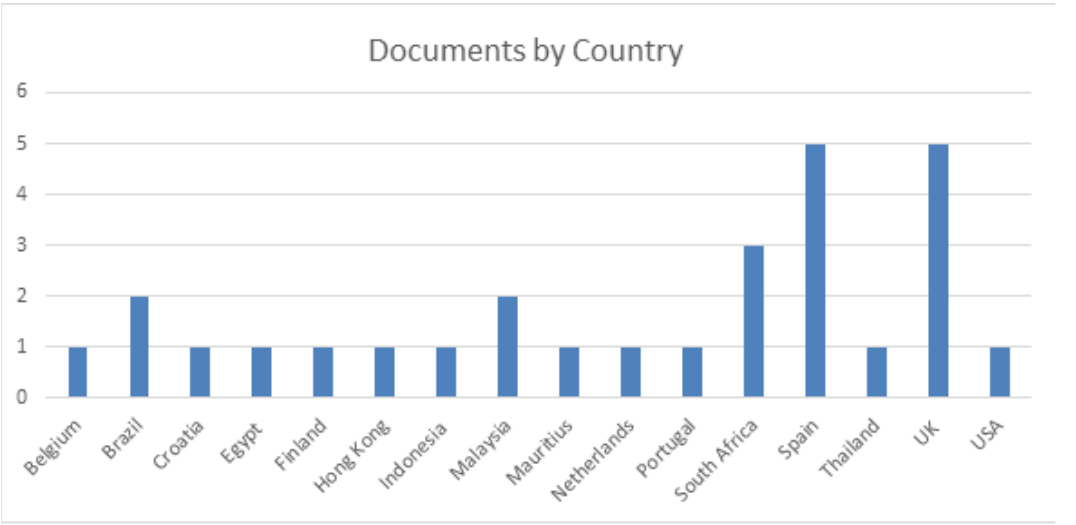
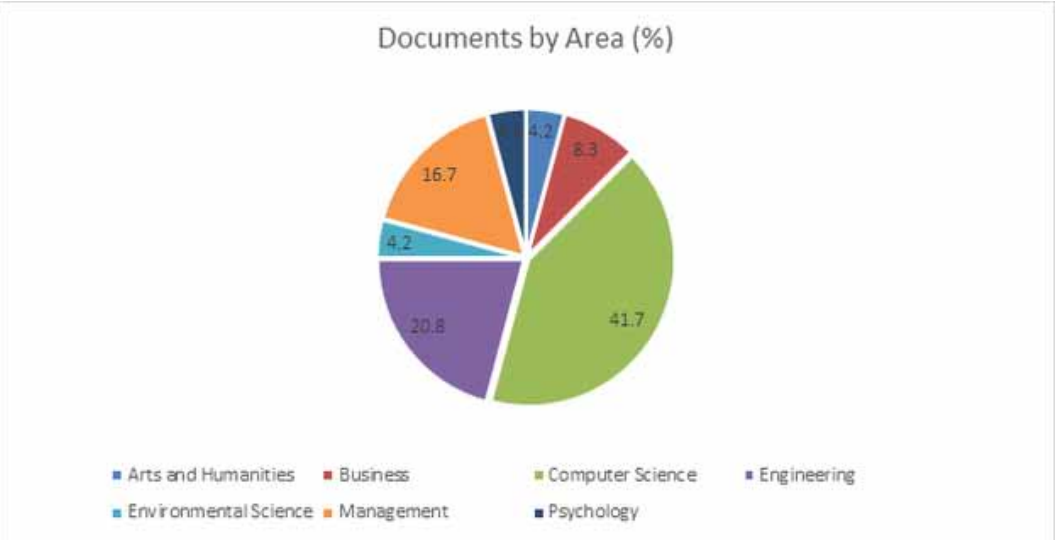


Figure 3. Fields of Higher Education experimenting with gamification



Observations based on Table 3 suggest that most studies have focused on measuring engagement as a way to motivate students towards participation and assessment as well as to address observations such as self-guided study and collaboration with the help of this new tool, gamification. Gamification has mainly impacted motivation of the Gen Z students of higher education (adult learning) positively to make learning more striking, stimulating, appealing, and ultimately operative. Some studies provide positive outcomes on learning outcomes also. Furthermore, some studies have gathered information on these variables bases perceptions via surveys and student experiences via feedback. According to researchers in general the results are positive but the context and quality of users should also be taken into account (Ortiz, Chiluiza, & Valcke, 4th-6th July 2016). The duration of exposure of students to gamification ranged from a few hours to weeks to a semester. Thus, the studies have been criticized for being too short to study an impact. Nevertheless, more empirical studies are needed to prove these claims.

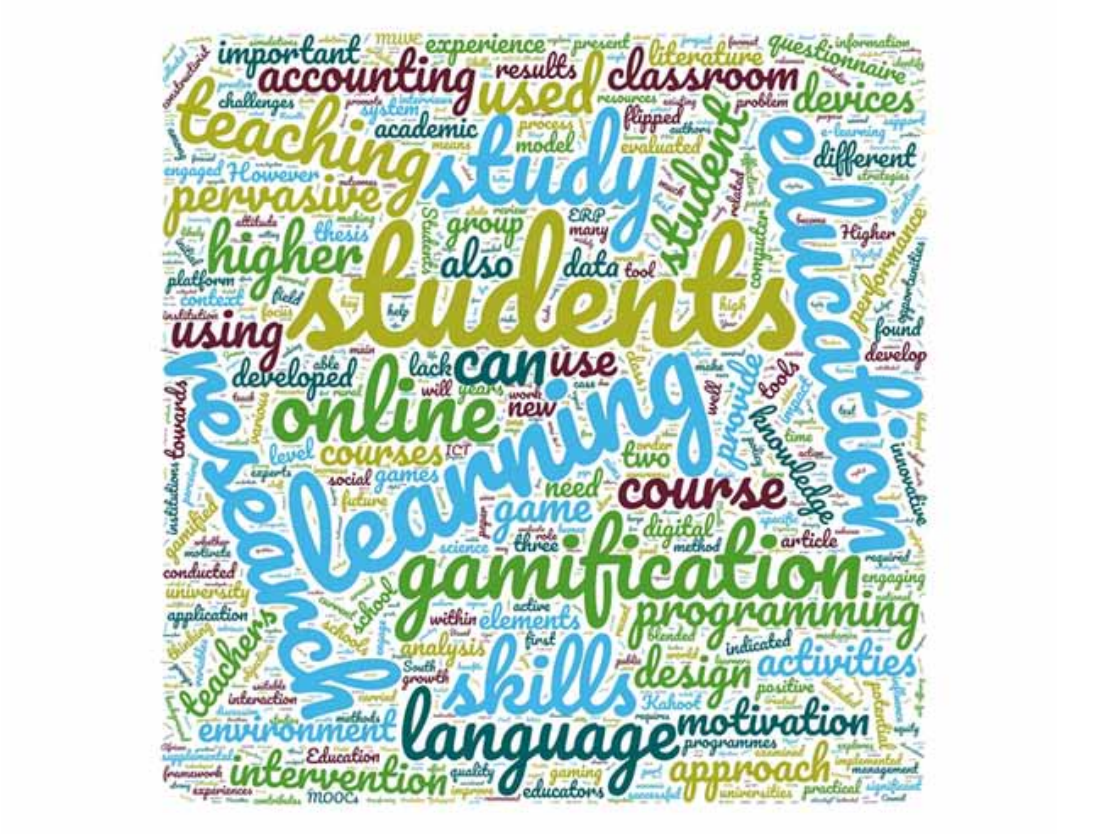
Variables, ideas, concepts linked to the use of gamification in the learning process can be depicted by a word cloud (Figure 4).

A word cloud was created using the abstracts of all the papers from the website https://wordart.com/create which is an open-source platform for the creation of word clouds. Figure 4 showcases that

Table 4. Gamification Elements

S.No.	Type of Element	Total
1	Combination (points, badges, leaderboards, challenges, levels, avatar, Games)	7
2	Badges	1
3	Points	2
4	Quiz	1
5	Games	14
		25

Figure 4. Word Cloud derived from the abstracts of the papers



there is a clear emphasis on words like ‘Students’, ‘learning’, ‘higher’, ‘education’, ‘gamification’, ‘online’, ‘research’ and ‘teaching’ which is the primary focus of all current research studies on gamification. Other words that are less prominent in the word cloud are ‘academic’, ‘teachers’, ‘motivation’, ‘design’, ‘activities’, ‘tools’, ‘intervention’ etc. These words indicate the areas which are being researched but to a lesser extent.

RQ4) Does gamification address Gen Z requirements and How?

Knowledge of gamification and technology in education will help understand conditions under which game elements drive student’s behaviour to achieve better results in the process of learning (Villagrasa, Fonseca, Redondo, & Duran, 2014). The use of mobile devices and apps has a significant positive bearing on students’ activity performance due to higher focus and engagement leading to better learning outcomes (Melero, Hernández-Leo, & Manatunga, 2015). In this section as part of the findings from secondary data, the authors attempt to map characteristics of Gen Z as addressed by gamification to realize the interconnectedness between the two. Areas in education where usage of gamification has been observed: Teaching; Assessment; Evaluation. Thus, its usage can be extrapolated to similar or more areas of higher education. Based on these, authors attempted to draw parallels between Gen Z and the use of gamification to motivate, engage them in higher education to positively impact their learning process. This builds a case for gamification for retention as well as

Table 5. Mapping of Gen Z Characteristics and Gamification Features

S.No.	Gen Z characteristics	Gamification Features
1	Use of **Technology** & Internet (Horovitz, 2012)	Technology-enabled i.e. Use of a digital platform on mobile devices. Collaboration technologies (digital projectors, interactive whiteboards). Online and blended learning
2	**Socialization** & **Social Media** as communication networks (Horovitz, 2012)	Gamification elements are designed to increase engagement and provide a coalescing goal for teams. (Latulipe, Long, & Seminario, February 2015). Community-based evaluation system and reinforcement (Bíró, 2014). Creating statuses
3	Modes of **Communication**: prefer multiple streams of information, frequent and quick interaction with content, technological and collaborative experiences (Frand, 2000) & (Oblinger, 2003) in (Ding, Guan, & Yu, 2017)	Gamification facilitates learning through increased attention spans and the added element of fun during the interaction and learning process. In addition, game elements also provide many technical options for language independence and adequate game challenges based on skill levels. (Ding, Guan, & Yu, 2017). points and badges and leaderboards (Damsa & Fromann, 2016)
4	**Entrepreneurial and Self-Sufficient:** self-starters, self-educated, and self-sufficient; rely more on self-service tools. Independent and competitive, (Schwieger & Ladwig, June 2018). Learn through Self-instruction (Seemiller & Grace, 2016).	Online and blended learning / Gamification user-friendly menu-driven
5	**Learning Preferences**: Hybrid teaching, flipped courses, YouTube	Gamification enables both synchronous and asynchronous mode of teaching. It allows the students to use the platform to conveniently take up the course at an appropriate aptitude level and learn sequentially (Jain & Dutta, 2019).
6	**Customization**: Accustomed to personalizing everything from Netflix shows to food at fast-casual restaurants. Desired more personalized micro-experiences as if anything is possible (Merriman, 2015).	Gamification offers learner-centric and specific experience and facility, is capable of handling diversified learning paths and other characteristics of learners (Bíró, 2014).
7	Spending **Leisure time** Around 70% of iGen college students' text 12 times a class, on average, and may spend two-thirds of their time on nonacademic activities	Leverage their desire for social interaction, involvement, and co-creation of experiences in the virtual world (Skinner, Sarpong, & White, 2018).
8	**Decreased ability to pay constant attention** (Ding, Guan, & Yu, 2017). Attention span is 8 seconds! prefer to communicate using icons, imagery, and symbols. Like regular and technology-enhanced learning opportunities and hence like opportunities that use visually enhanced modes of teaching.	The learning process is divided into small pieces, positive reinforcements (Fromann, 2012). Gamification has the visual dimension

Source: Compiled and proposed by the researchers based on evidence from the literature

firming up learning success as social elements intensify possible optimistic effects (Krause, Mogalle, Pohl, & Williams, 2015).

Imparting learning as per their preferred learning style makes students more motivated. (Cadersaib, September 2019) (Table 5).

Gamification characteristics: Fun, Motivation, Engagement, Learning, Persistence, Goal Achievement, Target accomplishment.

Gen Z traits: Internet and social media savvy, Social, Public appreciation, Visual learners, experiential learning, attention deficit, interest short-lived based on the literature review including reports like Ernst and Young (EY) conducted in various years like 2015, 2016, 2017; 2015 Cassandra Report; JWT Report 2012; Beal's Report 2016; Adobe Study 2016; The Center for Generational Kinetics Study 2017; Monster.com, etc.

Gamification is characterized by play, fun, community feedback, instant feedback, competitiveness, rewards in terms of points, badges, social status, leaderboards, display of achievements. Being active on social media seems to be the biggest motivator for Gen Z. Applying Gamification to motivate, engage, and teach Gen Z in higher education should then come as a natural choice. Coursera's course in gamification is one of the most successful courses on the website (Damsa & Fromann, 2016). This is a testimony to the fact what people believe gamification can do for this new age learner.

In all cases, positive outcomes were reported w.r.t motivation and high overall engagement. As faculty members make assignments to improve efficiency and keep students engaged, they could also aim to train students to function in future work-related roles (Mohr & Mohr, 2017). Students who finished gamified experience got improved scores in practical assignments and overall score but ill performed in written assessments and participated less in-class activities even when their original motivation was higher (Domínguez, et al., 2013). Another study found in gamification condition students had 23% better average scores and 25% increased retention which was almost 40% and 50% respectively with social elements (Krause, Mogalle, Pohl, & Williams, 2015).

Eg: GradeCraft collects data on assignments completed, performance with the help of rubrics and badges awarded throughout the course. The resulting data can produce valued insights about student behaviour vis-à-vis gamification (Holman, Aguilar, & Fishman, 2013).

6. CONCLUSION

This review sheds light on studies using gamification within a Higher Education context for Gen Z. Though most studies have been published since 2014, it is an area of global interest in education research fraternity as it currently seems to be restricted mainly to European countries, UK and US, and computer science courses. Lack of necessary skills required for developing, adapting, and maintaining a technological infrastructure (if digital-based) may be one of the reasons for this.

Higher education institutions (lecturers) must find new ways of teaching to better meet the different learning styles and educational needs of newer generations. This study builds a case for an alternative approach to better teach at higher education level to Gen-Z students. The Gamification approach complements the unique educational requirements of these students. It enables the cyclical, structured, and visual arrangement of activities leading to positive learning outcomes. Based on the limited studies on gamification in higher education, it seems that games may probably aid motivation and engagement of learners enhancing their intellectual activities by enriching their learning journey in a classroom. This may be achieved with the help of the most common gamification elements (Points, Levels/Stages, Badges, Leaderboards, Prizes and Rewards, Progress bars, Storyline, Feedback) (Nah, Zeng, Telaprolu, Ayyappa, & Eschenbrenner, 2014). Students' attitudes seem to enhance when using gamification (Seixas, Gomes, & Melo, 2016). Online platforms such as Kahoot!, Quizizz, Socrative, and Quizalize provide educators options to plan lessons and activities to captivate, inspire, motivate and engage students (Rahman, Ahmad, & Hashim, January 2019)

The landscape of future students and workforce is drastically going to change and hence this necessitates a study like this which gives insight into new ways of engaging and motivating the future generation especially in their education setups. Educators should leverage their excess use of mobile phones by making learner-centred environments and curricula to arrest them as active participants. The focus of this paper is not what is required to be delivered but how it should be delivered. Gen Z characteristics necessitate relooking into the delivery model of academicians. Evolving needs of society and industry necessitate the evolution of jobs and subsequently education (evolution of

Education 4.0). Today's environment has given a new dimension to the way education needs to be brought to the classes to keep pace with the requirement of the industry. Simultaneously the new-age learner also has different needs of learning and prefers different ways of learning. These push (external environment) and pull (students) factors make it imperative for the academicians to sit and think how to deliver the same knowledge that they possess in a way that is more palatable to his audience, the students. In this paper, the authors explore the new age tool, gamification, to be used by academicians in higher education to facilitate learning by engaging the students.

Reviews showed that gamification is widely used in formal education from K-12 to university courses (43%) (Caponetto, Earp, & Ott, Gamification and Education: a Literature Review, 2014).

The study provides a compelling case for the Indian Education system to adopt gamification as a new age tool for student engagement and motivation to learn in higher education. Games being common and acceptable universally their application to domains other than pure entertainment has been an area of investigation basically to stimulate similar motivation and engagement of gamers in learners toward education.

There is merit in the case and academicians in India should seriously play this game to engage and motivate students and facilitate learning experience as teaching is not successful without active involvement on the side of students (laws of learning and modes of teaching/ student engagement).

Gen Z are born technology natives and so rather than blaming the omnipresent sophisticated technologies as cause of student attention-deficit academicians should evolve new possibilities to motivate, engage, and teach. They should leverage the production of dopamine (Wimmer, Braun, Daw, & Shohamy, 2014), due to stimulation by a game-like environment. Moreover, game-based techniques can be customized to the learner's skill level preventing both frustration and boredom. Also, performance-evaluation and feedback are community-based. Thus, it is a beautiful blend of individual and community involvement.

There is a big digital divide where Europe, the UK, and the US are the largest users and developing countries hardly finding a place. Computer Science is the most popular course for this. Elements like feedbacks, leaderboards, points, and levels are used most and in combination. The key advantage of gamification is the low cost of development and the possibility of making learning content more 'delicious' or 'interesting' using game elements. Multiple researchers have attributed changes brought about by ICT to influence the way teaching, learning, and interaction take place to the shifting profile of today's students (Surendeleg, Murwa, Yun, & Kim, 2014).

It is claimed that gamification can advance the learning of the Net Generation by dividing the whole process into reduced sections and providing prompt encouraging reinforcements. Positive attitude, good experience, and ease of accessibility resulted in positively perceived utility and improved student performance strengthening the use of Kahoot (Varannai, Sasvari, & Urbanovics, 2017).

Social learning theory and self-determination theory may help explain the effectiveness of extrinsic and intrinsic motivations to increase engagement and performance in gamification. But, Deci, Koestner, and Ryan (2001) showed that all forms of rewards (extrinsic motivation) ultimately harm intrinsic motivation thus gamified system designers should look at ways using engagement and progression loops (motivation---action-----feedback-----motivation) to motivate in the long run (Tsay, Kofinas, & Luo, 2018).

7. FUTURE SCOPE AND LIMITATIONS

This study presents a first overview of what research literature is available in terms of gamification in Higher Education for Gen Z. Educationists in 2020 and beyond must be prepared to teach on digital platforms to engage and motivate because learning is not a spectator sport (Rothman, 2016). The current study will form a base for future primary data-based studies to corroborate the findings of secondary data. Further researchers may like to explore probable correlations between gamification and student performance and which gamification element is responsible for the largest improvement?

Though the number of studies was fairly small but based on this mix of empirical, theoretical and literature reviews the researchers would like to propose an increase in the use of gamification in related fields in India and in areas as varied as Biology to Management. Every course needs to devise its framework to use gamification as a technique to motivate and engage students to positively affect learning.

This field is relatively new and is growing in different research directions for example use of augmented (AR) and virtual reality (VR) in gamification of Mathematics courses. Most of this literature talks about gamification in IT courses especially in Europe, UK & US, rather than on the wider distribution of gamification towards facilitating its benefits in more courses across the board. Yet not all countries and courses are at the same level of technological development, infrastructure, or other resources. How other countries, colleges, and courses may gain from IT developments towards gamification is under-addressed in the existing literature.

A renewed understanding of Gen Z can help academicians relate to and support their educational requirements and move beyond conventional mode of teaching-learning and adapt ways that catch their interest. However, gamification may teach action only when presented with an external reward, and mandating play might no longer be fun.

Whilst the secondary data provides encouraging results, the authors realize the limited nature of this study and that improvements in student engagement may be due to novelty factors of techniques. More study is needed to find out if gamification through its elements can impact/affect actual learning along with students' engagement through motivation. The researchers also need to understand if the same is sustainable and applicable to other subjects. Also the study may not be applicable to all subjects and students from different backgrounds on account of cultural and educational differences. Nevertheless, gamification is an emerging and developing approach to learning.

To help these students capitalize on their potential, educators should know the past that forms the Gen Z perspective and create occasions to influence their exclusivity for constructive consequences. Researchers in (Su & Cheng, 2013) suggest the use of mobiles to produce lively education involvements to improve student motivation, engagement, learning, retention, delivery of need-based information, encouragement to solve problems, and satisfy curiosity. Furthermore, in the same paper researchers have also pointed out problems in helping and controlling learners in such hybrid environments(real and digital-world). Thus, making comprehensive learning models imperative.

Generation Z prefers snackable experiences and loves the engaging nature of videos. Long lectures will not hold their attention. Providing them with the right experiences may just win their trust resulting in motivation and engagement during classroom sessions. This is where gamification has been efficiently applied to some fields like education and may prove to be an innovative instructional tool, especially in higher education.

The current study complements and is consistent with the available literature that gamification is the new student-centric, effective, comprehensive, innovative, and preferred instructional strategy for Gen Z. Based on the course and topic one intends to teach game elements/ mechanics that may be used with or without technology. Though a digital implementation suits this techno-savvy Gen Z and aids the teachers in keeping track of students, more empirical studies are needed to prove the impact on motivation, engagement, participation, satisfaction, and learning. Some negative aspects like issues in designing, high competition, difficulties in assessments, etc. have been simultaneously stated. Thus, this paper helps in building a case for the use of gamification for teaching Gen Z at the higher education level. Besides, it identifies clear gaps that may be addressed in future research: a) different countries and other areas of study; b) Most studies use multiple game elements hence it is difficult to identify which element is associated with particular variables or effects in students. Researchers may like to isolate the impact of individual gamification elements; c) design studies to include player types, learning preferences and personality (mediating or moderating variable) d) develop high-quality research instruments and conduct study with a higher sample size of Gen Z students e) perform longitudinal studies to assess the real impact. Future research needs to assess that

gamification not only motivates the achievements and rewards of the system itself but also towards academic performance and learning of complex subjects, building practical competencies.

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