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Making Education Delivery More Effective Within The Classroom: Industry 4.0 And Gamification-Based Perspective

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Abstract

Purpose: *Technology is changing at a great pace; therefore, it is time that we adapt to these changes and implement them to improve our present education system. To inculcate the need of Industry 4.0 and gamification in the field of education, a case study is conducted among students comprising 13 research questions, each with a specific objective, is conducted among students to assess the problems/ lacunae faced by them in the prevalent education system.*

Methodology: *In this study, analysis done in Python to help comprehend the efficiency of Industry 4.0 and gamification in the sphere of education was emphasized while simultaneously addressing the flaws of traditional education. To augment this study, a Boolean expression is developed to determine the performance of the student taking into consideration three factors: nature of individual, the nature of the instructor, and difficulty of the subject.*

Findings*: It has been found that 32% of students are in favour of the gamified education system and 55% of the students are in the favour of gamified new system and present system. It also has been adjudged that pr[1]esent education system requires engagement from students to enhance the right knowledge among the students. It also has been found that gamified system will make disciples more interactive, intellectual, and pragmatic. Elements of gamification are listed along with the motivation levels of the students that describe the variation in the psychological and behavioural aspects. As a result, it becomes essential for the instructors to add the game-based learning elements according to the requirement of the organization. Moreover, the proposed comparative analysis is evaluated to determine the need for industry 4.0 and gamified framework and to portray the benefits of such a system over the traditional education system.*

Keywords: *Education System, Emotion Intelligence, Gamification, Game Elements, Industry 4.0, Teaching-Learning Approach.*

1. Introduction

Education is a lifetime interaction of acquiring information, continually gaining from each conceivable source every which way [Manimaran, (2013)]. Today, innovation has turned into a fundamental piece of our everyday life and it has tracked down broad use in

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practically all circles of ventures. The one area which has not stayed up with the adjustment of the innovation is our current learning framework. This is the explanation we are as yet following the customary book-based learning style. In order to adjust to the most recent innovation, the current instructive community's general outlook is needed to be changed. The central issue in the current training framework is the absence of understudy commitment and desirability. The current procedure centres on finishing the topic in an unequivocal measure of time instead of guaranteeing the high commitment of students during the lecture conveyance. As of late, a shift from customary blackboards to modernized smart classes [Chea et al., (2019)] has been seen as a stage towards modernization of the instruction framework to improve the commitment among students. In Higher education there is tremendous need to promote transformations and include strategic future planning for upcoming generation. The need of latest technologies as big data, 3D printing and smart sensors is widely used in various business sectors and are highly required to be part of education system[1].

Education bases on industry 4.0 is probably the most recent pattern in the training space that includes the utilization of most recent advancements such as iPads, tablets, and intuitive recordings to make the understudies more drew in [Chea et al., (2019)]. Presently days, it has been seen that the students are drawn in towards a wide assortment of advances [Eleftheria et al., (2013)]. As needs are, the system of gamification is one of the key methods that could give help to update the motivation of the students [Schreuders and Butterfield, (2016)]. Moreover, the blend of inherent and extraneous inspiration boundaries likewise assists with expanding the commitment among the students. To utilize the game plan thinking and different game components in a non-game setting, Gamification is the most common way [Deterding et al., (2011)]. To support conventional learning content of disseminated and simultaneous programming Gamification has been utilized [Maia and Graeml, (2015)]. Studies obtained from the field of gamification have exhibited that the results created by gamified frameworks are different overlap better compared to non-gamified frameworks [Rapp et al., (2019)]. As per this, a portion of the recognized essential key highlights is independence, inspiration, progress, experimentation, criticism, and variation [Subhash and Cudney, (2018)]. Gamification coming about because of the expansion of levels, badges, leader-boards, accomplishments, and focuses to a non-gaming situation is alluded as Gamification of BLAP [Nicholson, (2014)]. A discern of competition can also be created among students through leader boards. Then again, identification through badges supports a feeling of capability, and a point-based framework expands students' inspiration. Besides, due to a sense of flow, the level-based framework improves students' inspiration while learning complex ideas [Alomari et al., (2019)]. Gamification upgrades the user's experience while the execution of suitable game mechanics draws in them and guarantees that the instructive results last longer [Eleftheria et al., (2013)]. The utilization of different game plan components, for example, levels, identifications, leader boards, accomplishments, focuses, rewards, progress bar, criticism framework, challenges, and so forth are considered as the better fortifications for the inspiration and the commitment of the student [Alomari et al., (2019)]. Rhetorical gamification is adding standard game components, for example, those referenced above with very little consideration paid towards the account and game plan thinking [Landers, (2019)].

In this present education system, a lack of self-motivational means of engagement has been observed among students. Lot of challenges are faced with traditional teaching system. It has been found that the sole motto of students taking up a course and working hard is to just score the highest marks and eventually get placed in a good job. This is an easier approach towards the whole education system; however, there exists a lack of competence and knowledge [Gautam et al., (2016)]. The tools and resources which are being used in the present education system has become a primary reason in the development of a gap in skills and competencies among the students, unleashing their true potential [Chea et al.,

(2019)]. In this manner, instructors try to fit in the complete content possible in the stipulated time duration. Therefore, a need of adaptive teaching is observed rather than enforced teaching. The shift of Education 1.0 to Education 4.0 clearly depicts the new possibilities and urge to connect students and technology with global education system which focus on holistic approach of students [2] including industry 4.0 and gamified.

pattern.

To improvise self-directed learning in the class, motivational mechanism can be found in the games [Christo & Darina,(2013)]. Games with 3-D effects embarking industry 4.0 are considered a great element of inspiration and user commitment that comprise controls according to gaming requirements. Games can be utilized as a significant supporter in acquiring broad learning during instructive deployments [Lekka & Sakellariou, (2014)]. Games and their elements focusing on the parameters based on industry 4.0 are now being used not only for fun purposes but as actual learning dynamics. It is identified that introduction of accurate game elements helps to increase motivation and improves learning experience. Furthermore, gamification is influencing people with its game-related strategies to enhance overall system performance. Moreover, gamification is interpreted as a process which adds certain characteristics to the mechanism and changes its behaviour from one condition to another. It is considered as a developing approach used to enhance learner's engagement and self-motivation by uniting the right game elements in the education sector [Yohannis et al., (2014)]. The combination of virtual and physical resources is the major change required in Education 4.0, which doesn't focus on structured teaching rather than gives opportunity to learners to learn anywhere and at given point of time.

In this article, the need of the change in the existing education system is discussed in detail. A set of 13 relevant research questions consisting of 8 questions on existing system and 5 on industry 4.0 and gamified system is prepared for survey purposes. The obtained survey results are analysed to bring out appropriate conclusions. Furthermore, the results are utilized to design the Eisenhower's Decision Matrix to show the necessity of the industry 4.0 and gamified learning teaching environment. A table consisting of various behavioural changes brought about by each game element is also provided. The lacunas in the present education system are identified and the strategies to overcome are also presented in form of game elements. A Boolean expression is derived to determine student subject matter knowledge based on three parameters, namely:

- Instructor characteristics,
- Nature of subject
- Student characteristics.

The considered parameters are evaluated by utilizing the concept of K-Maps. The importance of emotional intelligence, is measured using emotional quotient (EQ), further explained in the form of a flow chart. To overcome these challenges, motivated means of engagement in gamified education have been proposed to upsurge the involvement of students in learning process.

The framework of the article is organized as follows: the teaching methodology of existing education scenario and the setbacks of it are mentioned in Section 2. In Section 3, several implications are discussed with respect to various game elements present in gamified frameworks and also comparison between the existing education system and the gamified education system is presented. The terminology of the conducted survey is presented in Section 4. The various outcomes calculated on the behalf of the conducting survey is presented in Section 5. Lastly, the article is concluded with some of the imperative future directions are presented in Section 6.

2 Literature review

A portion of past examinations describe the fundamental elements of gaming in training as follows: In 2014, Heilbrunn et al. identified observable tools for comparing the presentation of gamification to non-game environments. Certain software applications have been identified for use in the gamification analytics domain. Badgeville behaviour analytics, Gigya gamification examination, and Bunch-ball nitro examination all contribute to the clarification of gamification analytics. M. Laskowski characterised the educational framework's gamification capability in 2015. The author has taught gamification techniques in two courses, which have been evaluated. After the organisation of enrichment methods in the two courses, it was notable that students' contributions were implemented. Toda et al. (2015) defined gamification as being used to motivate, train, instruct, engage, or alter the behaviour of users. Gamified Math System (SiGMa) aims to prepare students' mathematical concepts. Gamification was implemented, and students were encouraged to engage in more critical thinking exercises. SiGMa was suitable for use in a classroom where students are being prepared to learn maths methods. Schreuders and Butterfield commissioned a review in 2016 to provide information on computer security using gamification and game-based learning. The focus of the study was to demonstrate that gamification has a significant impact on students' engagement, experience, and overall subject matter participation. Emotional intelligence is also enhanced by gamification, allowing students to comprehend others on a deeper level. In 2017, Yildirim discovered through his research that gamified educational practises can foster among students a positive, nostalgic attitude towards the topic. In 2018, Van and Zaman demonstrated the use of game elements to increase the level of motivation among students. Effectively observed is a downward trend in students' motivation throughout their academic years. Aparicio et al. demonstrated in 2019 that gamification of the instruction interaction played a decisive role in the success of Massive Online Open Courses (MOOC). The requirement for fourth industrial revolution has increased with the emerging new technologies and creating more challenging roles for humans [4]. In education we have moved from black boards to smart boards but new major change that needs to be evolved is digitalization, access to various online services and not to restrict it within boundaries[5], it needs to be globalized with the help of improvising new trends of industry 4.0 and gamification.
Gamification in instruction is enlarging the proper scholastics with a game-like arrangement by which understudies would track down gigantic inspiration and interest. A gamified-learning framework utilizes game components like focuses, criticism systems, leader boards, and so on subsequently guaranteeing constant student commitment and undeniable degrees of interest. An extensive positive effect can be acknowledged in the conduct of the students that can prompt the improvement in their abilities [Kiryakova et al.,(2014)]. As such; gamification in training can yield astounding outcomes when carried out productively, in contrast to pseudo gamification [Landers, (2019)].

2.1 Existing Education System

Building, arising, carrying out, and spreading information in various disciplines can be conceivable through education. Probably the greatest test is to guarantee that students retain and process the data and develop as basic masterminds. Advanced education establishments should be adaptable to change and expect the fate of education [Chea et al., (2019)]. The instruction framework needs to advance opportunity to time to match the necessities and prerequisites of more youthful students. The present age is powerless to control by different gatherings of people and may bring about unforeseen and unfortunate results like a turbulent society, political insecurity, financial downturn, and a lot more [Gautam et al., (2016)]. Schooling is the need of great importance and must be tended to at the most punctual. Two significant variables that can result in:

- Lacuna in the inspiration of students
- Low degrees of the ability to appreciate individuals on a deeper level

2.1.1 Lacuna in Motivation of Students

A particular and most fundamental supporters of scholastic achievement is the students' inspiration [Abramovich et al., (2013)]. In the article [Darby et al., (2013)], researchers have introduced a reducing pattern in students' inspiration over scholarly semesters and a long time all through the student's scholastic profession. In any case, it's anything but a successful practice to assess the scholastic presentation of an understudy. The conceivable part of the scholarly presentation of a student is assessed by taking a model with the following definitions:

Drawing a Karnaugh-Map (K-map) for 'R' to outline a Boolean verbalization for choosing a students' accomplishment in a subject 'X' thinking about the recently referenced variable in Fig 1.

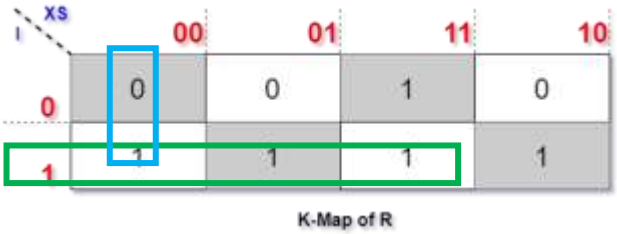

Fig 1. K-Map of R

In this manner, the got Boolean articulation is utilized to decide the high accomplishment of subject information. Drop-in inspiration levels lead to lack of engagement and in this manner, separation from the topic. Henceforth, measures must be taken to keep a consistent beware of the inspiration levels. Inspiration, commitment, and interest while learning exercises are indispensable for the improvement of students' abilities and skills [Alomari et al., (2019)]. Adding social components to the teaching strategy guarantees great joint effort among peers and urges the students to trade their contemplations, thoughts, and encounters. This causes them to feel more included and as a vital piece of the entire schooling process [Eleftheria et al., (2013)].

2.1.2 Low Levels of Emotional Intelligence

The interest to understand the part played by the capacity to appreciate people on a deeper level in a singular achievement has seen an increment of late. The capacity to acknowledge, use and deal with feelings emphatically with the expectation to self-persuade and make good friendly connections is characterized as Emotional Intelligence [Manimaran, (2013)]. The Emotional Competency Inventory (ECI) goes about as a proportion of the ability to understand individuals at their core dependent on the capacity to appreciate emotional intelligence [Goleman, (2001)]. A sum of 20 measures is comprehensively arranged into the accompanying four classifications: self/relationship management and self/social mindfulness. The current training framework principally bargains just in further developing students' IQ but doesn't zero in on their emotional quotient. It is extremely important for schools and universities to chip away at students' enthusiastic remainder for their general improvement [Manimaran, (2013)]. Scientists have expressed that sound capacity to understand people on a profound level (EQ) ought to be a prerequisite for students before they are given proper scholastic material in classes [Romasz et al., (2004)]. An outcome of a low degree of enthusiastic remainder is unfeeling towards true issues. This thusly prompts obliviousness on the most proficient method to tackle these issues. Along these lines, low EQ in a roundabout way influences ones advantage in schooling as portrayed in Fig 2.

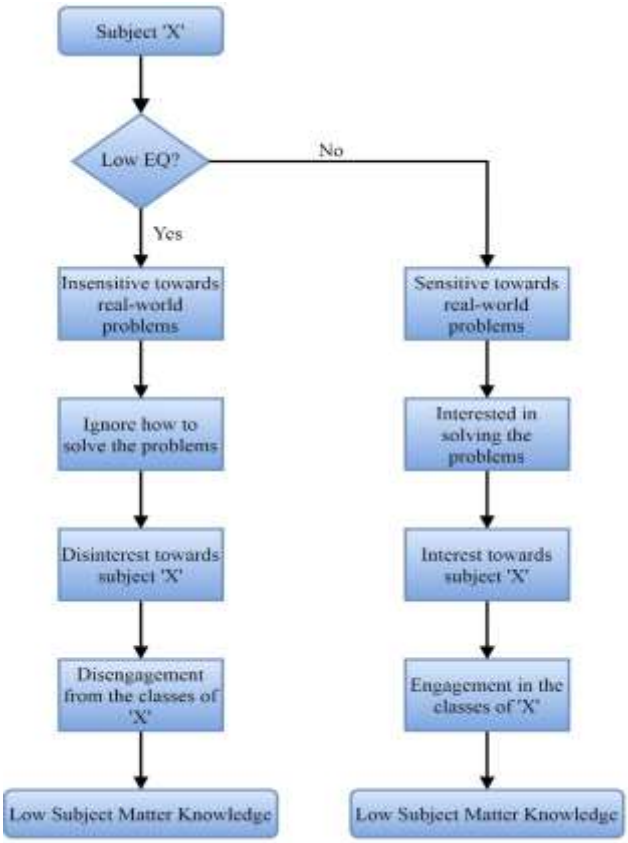

Fig 2. A Flow diagram of effect of student's EQ on their subject matter knowledge for a subject 'X'.

Along these lines, making inherent interest by ingraining energy, inspiring intermittently, completing intuitive and connecting with address meetings, routinely directing exercises, guaranteeing fun-based classroom learning, keeping up with fair EQ levels is exceptionally fundamental towards the commitment of students. The information got from the directed review shows that relatively few of these are being continued in the current Indian schooling framework. The training framework ought not overlook the way that numerous understudies of this specialized age simply are not thinking that it is fascinating to peruse from an endorsed reading material. Such a methodology will ultimately deplete students' advantage and inspiration to concentrate regarding studying the subject [Gautam et al., (2016)].

2.2 Need of Industry 4.0 and Gamified Education System

Industry 4.0 is termed in many publications as smart production, digitalization, smart industry most importantly evolving with latest trend [6]. To create industry 4.0 there is urge to enhance Education 4.0 and embed students with practical knowledge.

The terminologies like social networks, digitalization, cloud computing, bigdata etc. are not just limited to engineers or computer science field, they should be part of basic education. To have successful industry 4.0 implementation gamification can play a very vital role which will not focus on just learning but its elements are based on conception, idea and implementation. Gamification is characterized as the utilization of game parts, for example, dynamics, elements, frameworks, mechanics, and design thinking in a non-game situation. The essential inspiration driving this method is to take care of a specific certifiable issue by connecting with users/players, further developing user experience, advancing wanted social, and psychological changes [Deterding et al., (2011)]. There are a

couple of terms and ideas individuals typically are befuddled among [Kiryakova et al., (2014)].

While the term 'gamification' remains conflictingly utilized by various people in various settings, the idea of gamification is steadily attracting gigantic consideration a few spaces, for example, human-computer interface, education, and healthcare [Seaborn and Fels, (2015)]. Gamification makes gaining tons of useful knowledge more fun and drawing in using game components and parts. It should be noticed that not all game components are pertinent in all specific contexts. Game components must be picked by the specific situation and afterward executed [Aparicio et al., (2019)]. In an article by [Ding et al. (2017)], the creators have shown that gamification productively affects a person's intellectual, conduct, and enthusiastic commitment through game components like avatars, progress bars, badges, and so forth. A sound educating learning climate with dynamic understudy commitment is fundamental for their learning. The higher inspiration and commitment in instructive organizations executing gamified schooling frameworks can be credited to three reasons [Kiesler et al., (2011)]:

Consequently, executing a gamified teaching-learning system in high and secondary schools convinces students and, in this way, intrigues them in learning the subject. Nonetheless, anticipated gamification outcome is never yielded from the pseudo gamification [Landers, (2019)]. A preliminary assessment focus on flipped learning in which students were disengaged into gamification-updated flipped learning social affairs and non-gamified flipped learning bundles showed the past bunch conveying better quality antiquities in pre-course thinking practices [Huang et al., (2019)]. Gamification of teaching sessions has yielded constructive results in training not only at school education but at higher-level and the courses of management sciences [Van Roy and Zaman, (2018)].

The advantages of gamified learning frameworks help to see how these frameworks can be utilized and arrange their value with regards to universities. In a learning climate, gamification prompts the work of game component, for example, elements and mechanics in proper settings to give the ideal result. Gamification can be utilized in such a way that the ideal problems faced by the present level of the player would be transformed into points as awards.

2.3 Motivated means of Engagement in Gamified Education

For a person to play out a objective coordinated action and be impacted, the element called motivation is considered [Hartnett et al., (2011)]. This is fundamental for a person to play out an action with devotion. Profoundly energetic people are more likely to take up similarly intriguing exercises, stay dynamic, have a more profound agreement and acknowledge of the main job, and show upgraded perseverance, imagination, and execution. Through research done on the student’s motivation, it was shown that motivation of student is altogether a perplexing one and is peevish to situational states.

The circumstances encompassing the student highly impacted their intrinsic and extrinsic motivation [Hartnett et al., (2011)]. The vast majority of the previous gamification specialists have based on game components like ranks, points, badges, leader boards, and so forth. Nonetheless, the narrative is a vital variable that has frequently been ignored. The narrative is significant in making interest, particularly while presenting another point. Any logical law/standard/innovation/revelation/strategy certainly has some set of experiences that characterizes a short story on what social issue it is attempting to address. This is normally neglected, disregarded, or not gave a lot of consideration to by the educators. Teaching techniques are the real marks of the instruction framework which assist us with achieving the positive outcomes. The substance, strategy, instruments used to plan the design of a specific theme. Great sound input close by story would help in making a solid feeling of uplifting perspective towards the topic. Fun-based learning is an all-

encompassing methodology towards formal schooling wherein learning occurs through fun, intuitive and connecting with exercises to sustain and guarantee students' enthusiasm for learning and continuous improvement all through life. A few other normally utilized game components used between the students as distinct methods for their motivation incorporate challenges, progress bars, achievements, leader boards, level, accomplishments, ranks, challenges, etc. The Table 1 references the idea of inspiration and the ramifications achieved by the mentioned components.

Students through effectively utilizing their energy, inspiration, and absolute potential in games through gamification and using it towards learning can bring about their victory, all things considered, too [Kiesler et al., (2011)]. The behavioral change achieved by the previously mentioned game components are recorded beneath –

Table 1: Different game components and their behavioural impacts

Sr.no	Game Element	Element Description	Considered Motivation
1	Narrative	Produces interest (particularly on another point); Creates an inspirational perspective towards topic [Yildirim, (2017)]; Content conveyance; Flow of theory	Intrinsic motivation [Nicholson,(2014)]
2	Audio/Interactive learning	Makes uplifting perspective towards topic; Automated criticism component [Yildirim, (2017); Nah et al., (2014)]	Intrinsic motivation [Ryan & Deci, (2000)] **(cont..)**
3	Fun based learning	Powerful teaching method; Game-based learning; Engage in perky exercises	Intrinsic motivation [Marques & Nixon, (2013)]
4	Score System	Propels client, especially when performing computational undertakings; Engages users [Diniz et al., (2017); Alomari et al.,(2019); Nah et al., (2014)]	Extrinsic [Nicholson, (2014)]
5	Badges	Creates interest; Decreases counter-useful inspirational objectives, assuming any (over the top utilization of identifications may go against the last option and mischief characteristic interest); Gives a sense of pride and status [Abramovich et al., (2013); Gibson et al., (2015)]	Intrinsic and extrinsic [Gibson et al., (2015)]
6	Leader Boards	Makes a feeling of rivalry between players; Sustains client inspiration; Enhances client's collaboration with subject and at last their score [Schreuders and Butterfield, (2016); Alomari et al.,(2019)]	Extrinsic [Gibson et al., (2015)]

7	Levels	Makes a feeling of stream of topic; Gives a feeling of achievement; teaches fun and difficulties [Alomari et al., (2019); Diniz et al.,(2017); Kim et al., (2016); Goehle, (2013)]	Intrinsic motivation
8	Challenges	Capacity of skill; Enhances user execution [Alomari et al.,(2019)]	Intrinsic motivation [Ryan & Deci,(2000)].
9	Rewards	Verbal appreciation; Grades; Marks; Tangible and elusive prizes	Extrinsic motivation [Jayasinghe & Dharmaratne, (2013)]

Characteristic inspiration comes from self-assurance, self-inspiration, and self-capability. Extraneous inspiration is an aftereffect of outside impacts like results, positions, leader boards, ranks, rewards, or an inclination to meet another person's assumptions [Hartnett et al.,(2011)]. An effective system is planned with the mix of inherent and outward inspiration together.

The execution of different components of the game, for example, levels, scores, positions, leader boards, ranks, rewards, accomplishments, and so forth makes a positive effect on student's inspiration as portrayed in a few past examinations and researches completed [Rapp et al., (2019)]. Identifications assume an indispensable part in a student's inspiration. They are regularly used to grandstand a singular's accomplishment inside a local area, giving a feeling of approval to the user [Gibson et al.,(2015)]. Gamification empowers students' positive wistful mentality towards the topic [Yildirim, (2017)]. Levels, stages, or achievements are incredible assets educators can use to set the right progression of data and measure what is generally anticipated of student toward the finish of respective levels. The method guarantees that student do not get the realization of losing in the entire cycle, meanwhile the last goal appears to be much more feasible and quantifiable [Huang and Soman, (2014)]. Joining of game components to acquire user consideration, advance contest, support users towards the objectives, bring about group joint effort and correspondence can happen just in an intelligent learning climate, gamification gives that, an intuitive learning climate [Subhash and Cudney, (2018)].

2.4 Comparison between existing education system and Gamified industry 4.0 education system

- **Idea**: In the current framework, the idea is straightforwardly relative to the time factor. Then again, the gamified industry 4.0 framework is variable and advanced in nature.
- **Challenges**: Existing framework has inward tasks and tests as difficulties while the gamified industry 4.0 framework gives difficulties as exercises and online tests.
- **Environment**: Gamified industry 4.0 framework has a game-like environment while the current framework has a formal organized environment.
- **Instructing Methodology**: One-way instructing is continued in the current schooling framework. While, the two-way teaching process is continued in a gamified structure which incorporates flipped learning, points-based discussion, and so on
- **Results**: In the current framework, last stamps are utilized as key perfromance pointers. Be that as it may, every day execution perception is continued in the gamified structure.

- **Rewards**: In gamified training, understudies are compensated as ranks, positions, leaderboards, and so on while grades/marks are compensated in the current framework.
- **Content deliverance** : 1: m (Faculty: Students) content redemption process is continued in the conventional schooling framework while n:m (Students: Content Representor) process is continued in the advanced gamified training framework as portrayed in Fig. 3.

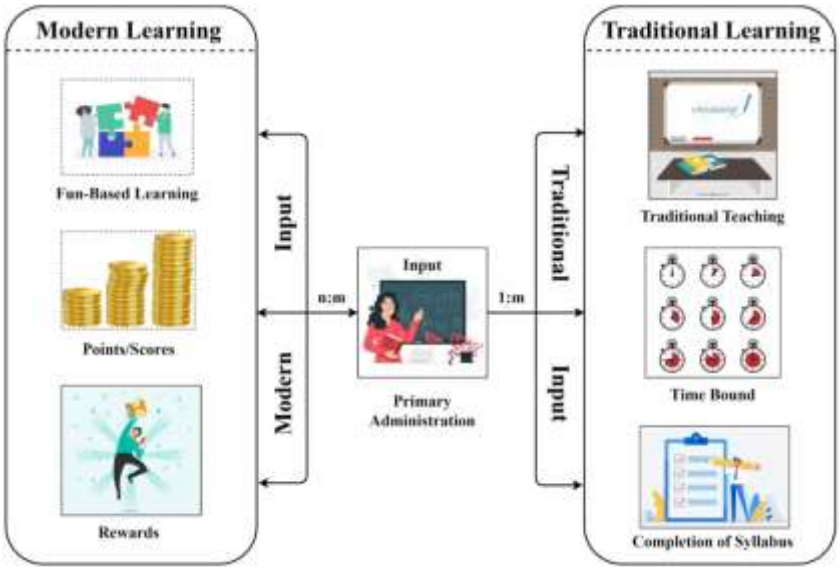

Fig 3. Comparison between existing system and gamified industry 4.0 system

Gamification is proved to be productive through a few advantageous results, for example, improved student commitment, expanded time spent on independent research, and finishing lab work. It additionally gave a system to intelligent assignments intended to connect with students [Schreuders and Butterfield, (2016)].

2.5 Some Common Misconceptions in Challenges

Quite possibly almost all the pervasive misguided judgments between normal students are that gamification has the potential to transform into a completely automated educational framework. It has become vital to recollect that the requirements of the gamification long stretches of debugging and tweaking within the well-informed authority's sight. Gamification is said to be a teaching methodology and not considered as a total substitution to the genuine human educating or preparing [Huang and Soman, (2014)]. Likewise, following a gamified teaching approach would not reduce the weight on the teachers, yet rather increment the responsibility. Educators would be needed to consistently convey criticism and keep a beware of the advancement of the understudies in a gamified learning climate. This criticism must be given at the earliest opportunity and persistently all through the span of the course, not at all like the current framework where the educator is expected to assess tests just twice or threefold in the whole course term [Dias, (2017)].
Gamification, dissimilar to usually confused, isn't simply restricted to adding game components like ranks, identifications, and points [Landers, (2019)]. Adding game components without appropriately pondering the ideal social and mental changes won't yield the outcomes wanted. Outward Motivation sabotages inborn inspiration [Ryan and Deci, (2000)]. When students begin getting compensations for accomplishing tasks which are loved by them, ultimately, they start losing interest pertaining to the action and do it only for the prizes. The method may bring about students winding up needing to study or understand the topics just when given rewards remotely [Kiesler et al., (2011)].

3. Methodology

Research methodology consists of four phases represented in fig 4. Phase 1 depicts what is industry 4.0 and gamification and its need is explained in detail. To validate the research gap in phase 2 The study is comprised of 13 research questions, each addressing a specific variable applicable to either present instruction or gamified training framework.

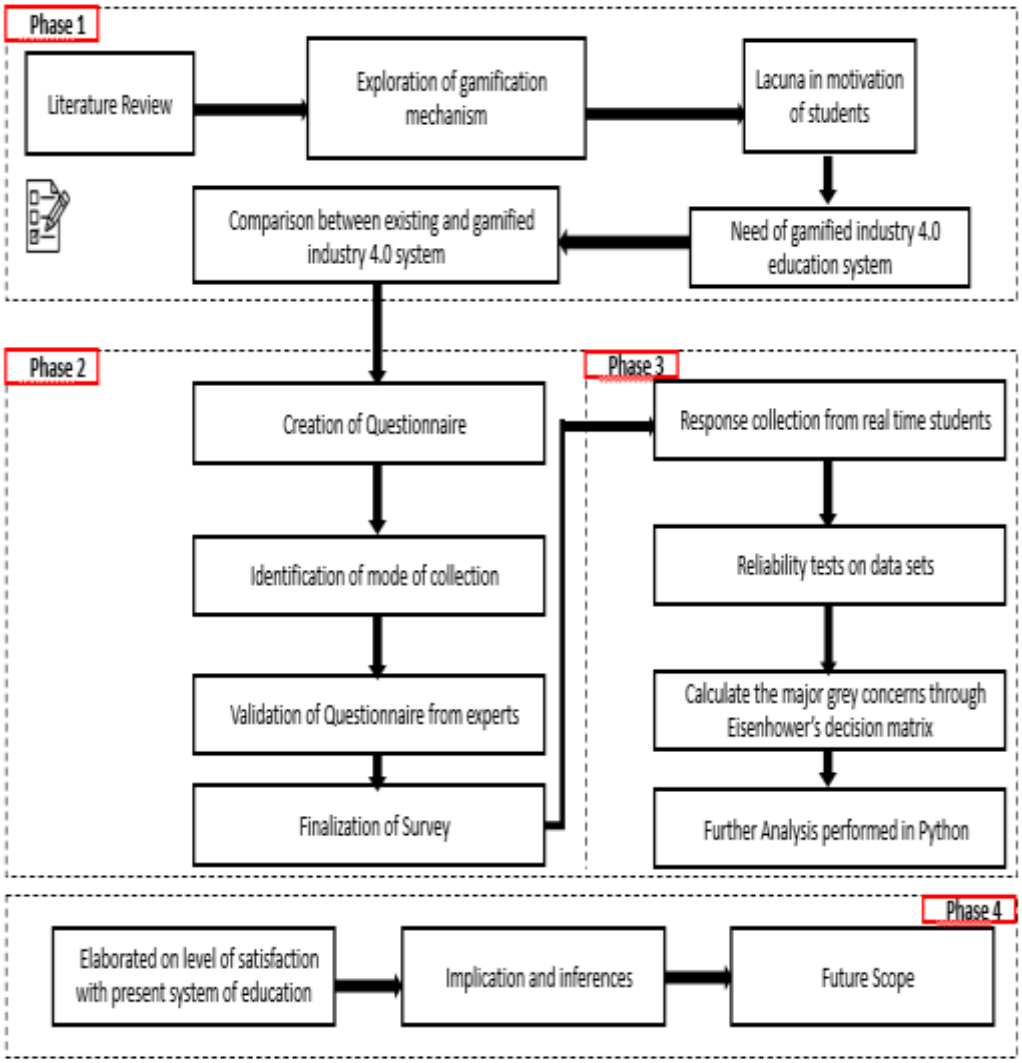

Fig 4 : Research methodology

The information accordingly gathered has been dissected through numerical displaying to calculate the loop pools in the current training framework and the beneficial elements of a gamified instructing learning framework. Phase 3 clearly states the statistical analysis based on the survey conducted. Phase 4 depicts the implications and future scope of this study.

3.1. Research Flow Overview

In this review, the conduct and mental effects made by the current schooling framework are dissected through an inquiry answer overview and contrasted and a gamified instruction environment. The proposed study starts with the recognizable proof of gaps in the current instruction framework, making goals, making applicable research questions, arranging the shaped inquiries into different areas (specifically 'Inquiries on Current Education System' and 'Inquiries on Gamified Education System'), sharing with regards to the study on different internet-based stages and investigate the acquired outcomes.

3.2 Survey Participants

The overview structure has been imparted inside the student community to help of a few social stages like Facebook, WhatsApp, Twitter, and so forth. The review has been taken by a sum of 137 students from various scholarly background. We had 96 male and 41 female understudies from various schools (eg. KL University, Gayatri Vidya Parishad, Lovely Professional University, and so on) across different states of India (like Punjab, Gujarat, Andhra Pradesh) seeking after an assortment of courses going from B.Com/B.B.A, M.Com/M.B.A, B.E/B. Tech B.Sc to M.Sc, M.E/M. Tech were the participation of this survey. Both the areas provided with certain outputs (specifically 'Current Education System' and 'Gamified Education System') which were examined to decide if it is needed to evolve the learning-teaching framework, an existing approach to a modernised gamified one.

3.3 Reliability tests on data sets

By using the Cronbach's Alpha Test, the unwavering quality of the survey have been checked. The mentioned test approves the consistency of internal factors and is viewed as a scale of dependability. Thus, this technique could be used to check the consistency, acceptance, and validity of information. The programming method called SPSS programming is utilized for the abovementioned reason and the means followed are portrayed as follows Open file-> insert data -> analyze -> scale-> Apply reliability test. The Cronbach's Alpha Test gives admissible result and have been mentioned in Table 2. The results depict that the information gathered is legitimate and any conflicting information focuses were not found. The alpha value has been characterized in Table 3which is more prominent than 0.6, showing that the gathered information has great interior consistency.

Table 2 Case Processing Summary

	N	%
Valid cases	137	100
Excluded[a] values	0	.0
Total Values	137	100

a. Deletion based on variables .

Table 3 Statistics based on reliability test

Cronbach's Alpha value	Cronbach's Alpha value based on Items that are standardized	N of Items
.734	.703	13

Table 3 shows the information gathered is legitimate no conflicting information esteem is found. Table 4. Characterizes the alpha value got from Cronbach's test which is and assuming it is more noteworthy than 0.6 which shows the gathered information has great internal consistency.

4. Results and discussions

The survey brings about Table 5 show that very few are happy with the current framework, the assessment is fairly nonpartisan or malcontent. Overview shows that understudies are

not feeling roused to concentrate on novel thoughts and the current teaching technique isn't connecting with and adequately intelligent. Q1 unmistakably expresses that just 8.8% of students firmly concur and the rest 91% of students have low inspiration levels. There is a need to teach inherent persuasive variables which establishes a environment to wrap up a specific job or draw in them with interest. Q2 study results express that 6.6% of students unequivocally concur that the current methodology is sufficiently intelligent while the rest 93.4% feel there's still a great deal of opportunity to get better. Intelligent teaching procedure improves the maintenance of the subject which makes it exceptionally fundamental for instruction. The Q3 states that main 8 % of students unequivocally accept that project-based teaching strategies are directed. Another hand, classroom learning is profoundly hypothetical in nature and the exercises are restricted, or in a couple of cases, non-existent. The teaching procedure selected by the current instruction framework is as yet in view of the talk framework and least contribution of students. Aftereffects of Q4 express that while 8.8% of students emphatically accept, the current framework is encouraging and creates assurance and fulfillment. The teaching framework needs to make commitment and assurance while teaching new subject for compelling learning by the students.

Attendance is one of the authorized boundaries utilized in the current instruction framework. In Q5 results portray that just 13.1% of students will jump at the chance to go to the actual classes assuming participation isn't the required standards. Q6 states that 87% of students accept that the current instruction framework is marks-oriented, however doesn't oblige the general improvement of the student. It is fundamental for students to learn things outside of the books and not concentrate only for the imprints. While marks are a measurement for estimating a singular's information, they can't be the sole appointed authority for the equivalent. Q7 states that 93% of students feel that imprints are not an adjudicator of information. An impressive number of individuals (44 students) have said that the current methodology is not based on the individual knowledge aspect but purely oriented on educational scores. On an entire, 10% of students provided our current framework with a rating of 1, 20.4% gave a rating of 2, 41.6% gave a rating of 3, 19.7% gave a rating of 4 while just 8% gave a rating of 5.

The requirement for further developing the current schooling framework by bringing another one that builds up students' inspiration and commitment is obviously portrayed through the result of Q9 and Q10. Near 90% of students concurred that there is a need to further develop the current showing approach with a seriously captivating one. From Q11, it was comprehensible that students are intrigued to go to school regardless of whether participation was not obligatory assuming classes were educated in a gamified style. The greater part of the review reactions (~90%) have expressed that there is a requirement for further developing the current training framework. Results show that another instructing philosophy that upholds students' inspiration, intelligence, and commitment would help them better. A colossal number of understudies (~81%) said that despite the fact that the school followed a 0% least participation necessity strategy they would join in assuming each subject was instructed in a gamified style with latest technologies focusing on industry 4.0 trends .

Table 4: Survey results

Q No.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Existing Education System					
Q1	8.80 %	42.30 %	28.50 %	15.30 %	5.01 %
Q2	6.60%	43.10%	29.90 %	15.30 %	5.10 %
Q3	8.0 %	24.80%	29.20 %	27.70 %	10.20%

Q4	8.80%	38.0 %	30.70 %	17.50 %	5.10 %
Q5	13.10 %	40.10 %	21.20 %	16.80 %	8.80 %
Q6	14.60 %	32.10 %	21.02 %	20.40 %	11.70 %
Q7	7.30 %	26.30 %	21.09 %	29.20 %	15.30%
Q8*	8.0 %	19.70 %	41.60 %	20.40 %	10.20 %
Gamified Education System					
Q9	55.50 %	33.60 %	6.60 %	3.60 %	0.70 %
Q10	40.90 %	49.60 %	7.30 %	0.70 %	1.50 %
Q11	38.70 %	43.10 %	13.10 %	4.40 %	0.70 %
Q12*	45.30 %	28.50 %	21.90 %	2.90 %	1.50 %
Q13*	47.40%	30.70 %	16.80 %	4.40 %	0.70 %

*****Measured on a scale of 5-1; the columns 'Strongly Disagree' represents 1 and Strongly Agree' represents 5.

The study likewise gathered data on the pressing and essentiality of RQ12 and RQ13 for the schooling framework to be gamified. the acquired reactions can be set as in the underneath figure. As drawn from the Eisenhower's Decision Matrix given beneath.

Urgent & Important **Do**	Not Urgent & Important **Schedule**
Urgent & Not Important **Delegate**	Not Urgent & Not Important **Eliminate**

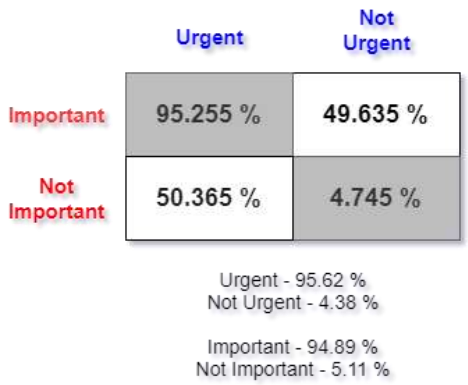

Fig 5. Eisenhower's Decision Matrix

An extremely high level of students has revealed that it is exceptionally dire and profoundly important to make a move and further develop the current instruction framework as displayed in Fig. 5, in this manner setting it in the first box, the 'DO' box, of the Eisenhower's Decision Matrix.

5.1. Further analysis has been performed in Python
Analysing the columns in detail by dividing the students into 9 categories:

1 - Satisfied with new system and satisfied with current system

2 - Neutral for new system and satisfied with current system

3 - Dissatisfied with new system and satisfied with current system

4 - Satisfied with new system and Neutral for current system

5 - Neutral for new system and Neutral for current system

6 - Dissatisfied with new system and Neutral for current system

7 - Satisfied with new system and dissatisfied with current system

8 - Neutral for new system and dissatisfied with current system

9 - dissatisfied with new system and dissatisfied with current system

5.2. Results

Category - 1 : 76, Category - 2 : 1, Category - 3 : 0, Category - 4 : 45, Category - 5 : 1, Category - 6 : 0, Category - 7 : 13, Category - 8 : 1, Category - 9 : 0.

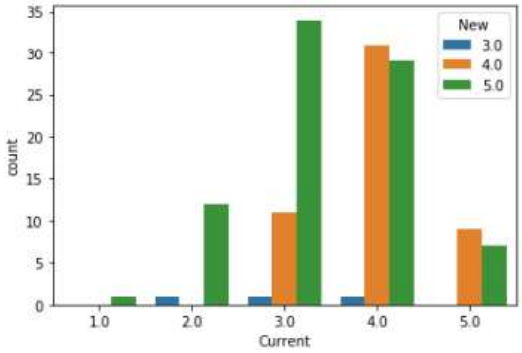

Fig 6. Level of satisfaction of students

The collation of the students' level of satisfaction for the on-going system with the new system's level of satisfaction has been given in Fig 6. It basically provides the count of students based on their rating given to the new and current systems. The blue coloured bars represent a rating of 3, orange represent a rating of 4 and green - a rating of 5 to the new system. The total no of students who gave a rating of 3 to the current system is approx 45. Out of those 45, 1 has given a rating of 3 to the new system, 10 rated 4 and remaining 34 gave a rating of 5 to the new system. Basically, what this graph signifies is that most of the students are providing positive feedback to the new gamified system (see the no of green and orange bars) and there is no student who rated the new system under 3.0. Every student which is unequivocally disappointed with the current framework firmly support the new, gamified framework which incorporates trends of industry 4.0. (Rating 1.0 for the current system, and rating 5.0 for the new one)

- The majority of the students that are disappointed with the current framework emphatically support the new framework, while just one of them is impartial for a new framework, for example, the student is disappointed with the current framework however it doesn't make any difference for him/her assuming that the new framework is carried out or not.
- Though listing out the students who have an impartial methodology towards the current framework, most of these students are in solid approval for execution of gamified framework, while one of them is unbiased towards new framework additionally for example for this particular student, it doesn't make any difference which framework would be considered for utilization.
- Everyone except one of the students who are fairly happy with the current framework, likewise consent to the execution of the new framework and are in support of it. Just a single student has an unbiased methodology in regards to the new framework.

Every one of the students who is unequivocally in favor of the current framework is additionally prepared for the execution of the new - gamified framework focusing on latest technologies which focus on industry 4.0 trends.

5. Conclusion, limitations, and future research agenda

Formal schooling for youthful personalities is a significant part of building the eventual fate of this world. From the current study, it has been broken down that the current training situation has a few restrictions concerning the general commitment and information on the students. The basic study characterizes the low degree of interest of the student towards the current instruction framework that is an issue that should be tended to on vital premise. Today's gen-z wants technology, system and solution to be industry4.0 ready. Games are fundamentally viewed as a wellspring of entertainment and amusement which makes a constructive effect on the mental health. The games could be utilized to cover the gaps of the current instructing and learning proposition. The students' inspiration regarding their studies could be perceived through the inferred Boolean expression Components of gamification, for example, positions, leader boards, badges, and achievements create accomplishments among people. Besides, narration, positive connection, criticism sessions, fun-based learning are a few different components that characterize the mix of inherent and extraneous inspiration that assists students with learning the subject in an appropriate way. The current state of education 4.0 along with gamified framework can make the students integrated, optimized and compatible to survive in the market of industry 4.0. Subsequently, thought should be taken while adding a specific game component. EQ of an individual is additionally similarly significant when attempting to cause the person to comprehend the need for an answer for any true issue.

Students passed on their perspective, through the survey, that it is profoundly fundamental to work on the current framework at the soonest conceivable; subsequently, putting it in the 'Urgent - Important' quadrant of Eisenhower's Decision Matrix. Teachers need to remember that only the gamification of education can resolve these issues. There is no fixed gamified model that can be formatted and implemented in education system. Each subject requires different parameters of gamified industry 4.0 parameters whose implementations will be highly dependent on the faculty who is involved in teaching a particular course. In beginning the gamified industry 4.0 will have a huge impact but to keep it on same pace faculty individual effort will be obligatory.

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