

The Gamification Design for Affordances Pedagogy

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ABSTRACT

This study aims to design a gamification affordances pedagogy. Affordances are the ways in which we perceive environments to support the needs of learners in the educational system. The main questions are how gamification elements can influence student engagement to improve their affordances. Affordance behavior is a human behavior that refers to a mindset; an attitude or opinion, especially a habitual one. Motivational activities can change a learner's behavior. A skill-based mindset can be created through the use of affordance motivation. Affordance refers to the points, badges, and leaderboards in gamification elements. This research aims to improve the affordance mindset design of interactive systems with gamification. The affordance design will improve the pedagogy related to engagement. The research focuses on the mindset factors and the relationship between the factors that promote the desired learning outcomes. The findings may help in designing the gamification affordance design method for affordance pedagogy. The expected model could improve learners' affordances and instructional activities.

1. Introduction

In the 21st century, there is extensive research on growth mindset and intrinsic motivation in learning. The constructs of mindset and motivation are important for educators to determine the impact on student learning and outcomes [1]. Understanding the two constructs, mindset and motivation, and the relationship between them is necessary as it provides insight into student motivation and drive. Gamification is a tool that can increase and promote user motivation, especially in education. The educational concept requires that teaching and learning activities are more fun and interesting [2]. Today, learner engagement is still a challenge in the education system. Design is employed in education to increase the student desire to focus on the educational task [3], as an affordance mindset. Educational games and various forms of edutainment have gained more attention in the discipline of learning and teaching strategies. Educators believe learning can be enhanced through play and fun [4]. The increasing motivation to learn may affect the learner's affordances. An affordance concerns

the possible actions that an item offers while learning. The term affordance is a somewhat ambiguous term [5]. and affordance could be improved in terms of its ability to influence learning outcomes.

Learner can conduct their learning lives using advanced technology that engender an affordance behavior mindset. The mindset is a crucial factor in learner motivation. Affordances are a core opportunity for action [6]. A mindset can change the attitude to learning in the education system, which represents a step in the right direction.

This paper reviews several recent gamification studies that focus on growth mindset and motivation. The theoretical frameworks of Affordance Mindset and Motivation reflect how they are applied in educational gamification. The research design is divided into two parts. The first focuses on the engagement elements related to the gamified classroom activities. The gamification strategies are then designed by using the mindset factors and learner characteristics. Then the gamification affordances design method is applied through points, badges,

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leaderboards and ranks in gamification activities for the pedagogy strategies.

2. Literature Review

2.1. Mindset

The mindset is a set of both conscious and unconscious human beliefs, which relates to how humans view what they consider to be their personality. Mindset can be divided into two types, Fixed Mindset and Growth Mindset. These mindsets refer to the way people think about the nature of intelligence and learning. People with a growth mindset value effort, tend to set learning goals (e.g., mastery) rather than performance goals (e.g., grades), and attribute failure to lack of effort rather than lack of ability [7]. Learners' mindsets can be influenced by school-based activities to help improve academic outcomes [7] through motivation and engagement.

2.2. Motivation and Engagement

Motivation and engagement indicate passion and emotional involvement in learning activities [8]. Engagement permits meaningful learning, which includes the quality of student effort, student interaction and their immersive experiences [8]. Some research divided engagement into three dimensions: behavioral, emotional, and cognitive engagement [3].

2.3. Motivation

Motivation is an abstract construct used to explain people behavior. The behavior represents the basis for people's actions, desires, and needs. Motivation can be named as one's behavioral direction, or what justification a person wants to repeat a behavior [9]. Motivation can be allocated into two different types known as intrinsic (internal) motivation and extrinsic (external) motivation [10]. Intrinsic motivation is the desire to seek new things and new challenges, to analyze one's abilities, to observe and to gain knowledge [11]. It is driven by interest or enjoyment in the task itself and exists within the individual rather than relying on external factors or the desire for reward. Intrinsic motivation arises from within the individual, just as the idea of an affordance draws attention to a possible action [12]. Extrinsic motivation mentions to the performance of an activity to attain a desired consequence and is the opposite of intrinsic motivation [11]. Extrinsic motivation is the type of motivation that comes from outside the individual and often involves rewards such as trophies, money, social recognition, or praise. In education, motivation is a major cause of differences in student learning outcomes, considered a possible predictor of a student's academic performance; students with high academic motivation are more likely to succeed academically [13]. Students who are intrinsically motivated are more likely to be curious and inquire about the process, focusing on the task itself rather than just the outcome. In contrast, students who are extrinsically motivated are more concerned with the outcome (e.g., grades, prizes) than with the process of completing the task itself [14]. Game activities could encourage player

experiences, which is called immersive engagement. Engagement also influences people's adoption. Behavior usage is how frequently or for what purpose the behavior is used while behavior adoption is the degree to which the behavior is utilized. Psychological outcome is a measure of effort. The level of effort is influenced by emotional engagement (pleasure, excitement, and persistence), behavioral engagement (effort), cognitive engagement (attention, reflection), and learning performance (perceived competence, perceived improvement) [3]. The student can repeat desired behaviors by reinforcement providing. Reinforcement incentives people into two forms of motivation. The first one is intrinsic motivation that refers to engage in behaviors for enjoyment, challenge, pleasure, or interest [5]. Then, the extrinsic motivation can engage in an activity to earn an external reward when learner is motivated to perform their behavior [1].

2.4. Engagement

Engagement is the extent to which a learner connects with the gaming environments and indicates a positive psychological state of mind when so doing [15]. Games' activities provide immediate feedback, which is more effective and efficient than traditional learning strategies. Gamification strategies can encourage the learner to acquire experience during play. Game experiences drive personal change and transformation by generating an attitude of acceptance about the challenge, motivation to achieve, and constant innovation by simulation. Simulation encourages the participant to immerse themselves in learning [16]. Adaptation is the process by which strategies are moderated by engagement. Adaptation is a consequence of activities and events that are enhanced, developed, and implemented. Success in learning depends on the learner's desire to learn, which is known as behavioral intention [17]. Learners can change their behavior as a result of motivation. Engagement may encourage behavior. Usage can be influenced by behavioral assumption. The focus of usage behavior is on specific activities performed using specific sources of information. These include general knowledge acquisition, learning, and the pursuit of purposes [18].

2.5. Gamification Affordances

As a concept, affordance provides a useful bridge to explain the interplay between the artefact and the human user [5]. Gamification elements could provide a thematic evaluation of subsequent formulations of the term affordance. This is the method designed to provide a preliminary overview of how the notion of affordance can be interpreted. The figure 1 shows the direct perception of affordances for the user along with a consideration of the user's skills. The researcher refers to the "flow channel" as a linear function on a plane with skills and challenges as axes. An increase in the learner's skills is due to learning, and an increase in the challenges of performing a task is due to novelty [19]. The pedagogy design may keep the two in balance between challenges and skills. Subjects experienced Flow when they first encountered a task with a high balance between skills and challenges [20]. Skills are due to learning and an increase in the challenges of performing tasks [21], which relate to an affordance. The design of the

pedagogy allows for a practical mapping flow onto the gameplay. The approach enhances the player's interaction with the game elements and provides useful insights into the learner's skills [21]. The next section presents gamification affordance strategies including points, badges, and leaderboards.

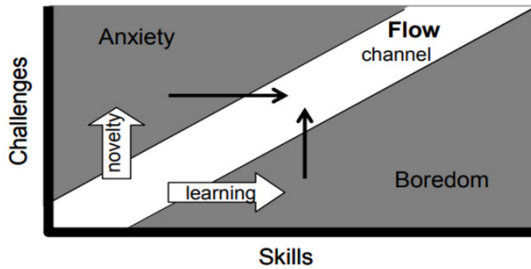


Figure 1: The Flow Channel

2.5.1. Points

Point is the activity outcome. Game point can trigger and reinforce situational awareness competencies. Points can provide information about the player's progress such as response times, correct answers, and the procedures followed during play. The awarding of points is connected to behaviors that require crucial competencies [22]. The competencies can develop as a training tool for learning goals [23].

This paper aims to design affordance mindset processes through the player data. The affordance for learning is measured by questionnaire questions regarding learners' sense of pride and community acceptance. The satisfaction of basic psychological needs (competence, autonomy, and relatedness [24]), is a fundamental requirement for being autonomously motivated. Competence refers to the experience of success by fulfilling challenging tasks and gaining mastery within an environment [25] and is reflected by the number of points scored.

2.5.2. Badges

Badges reflect performance results. Digital badges indicate the achievements or skills acquired while playing the game. These badges are collected and displayed to the other players [25]. Gamification elements are used to encourage performance and skill acquisition, which are the desired learning outcomes.

2.5.3. Leaderboards

The most-used game element is leaderboard that refers to a ranking board of the players in a competitive event. The leaderboard is to illustrate player where they are ranked in a gamified system. Leaderboards' mechanic can be employed in various ways to offer goals and to increase motivation [26]. Leaderboard ranking can motivate players to compete, which increases participation [27] and facilitates comparison and competition. Leaderboard is the basic elements that make up games that combined to deliver a system of mastery to end users [28].

2.6. Cognition

Cognition refers to the mental processes involved in the acquisition of knowledge and understanding. These cognitive processes include thinking, knowing, remembering, judging, and problem solving [29]. Cognitive processes affect every aspect of life, from school to work, to relationships. Some specific uses for these cognitive processes include the following.

- Learning New Things that require being able to take in new information and form new memories. The learner makes connections with other things that they already know.
- The formation of memories is a major topic in the field of cognitive psychology. Memories refer to how people remember, what they remember, and what they forget, and reveal much about how cognitive processes work.

Making decisions means making judgments about things you have experienced and processed. This may involve comparing new information with previous knowledge or integrating new information with new knowledge before making a decision [30]. Behavioral action refers to use, i.e. the fact that it is used, or habit. Relationships have been found between adoption, post-adoption variables, and usage behavior in the post-adoption process. Continued use based on experience and satisfaction in the post-adoption process represents high quality use [31]. Post-adoption, each individual is engaged in change behaviors to varying degrees. In this context, several factors may influence the relationships between adoption and post-adoption variables [31].

2.6.1. Positive Feedback

Positive feedback is a game mechanism. This mechanism is designed to accelerate or enhance ongoing output [32]. Gamification can be applied to stimuli of increasing intensities through intrinsic rewards and feedback. The user-centered design activities require an interactive feedback. The learning activity feedback is determined by people's motivation and cognitive mindset.

2.6.2. Growth Mindset

The term mindset refers to implicit beliefs that have been shown to influence the thoughts and actions of individuals [33]. A learner's mindset has been shown to influence his motivation and academic performance [34], [35]. Growth mindset type means that a learner can improve his talents and abilities through effort. Growth mindset belief is a type of intelligence that can be improved through hard work and the use of strategies [36]. Growth Mindset can be generated through motivation and achievement [37], [38], could promote learner's engagement.

A growth mindset helps learners improve their skills and knowledge over time, and mindset research studies the power of such beliefs in influencing human behavior [39]. Mindset is a soft skill of great importance [40]. For example, athletes are driven by success and can realize their potential through effort, practice, and instruction. In the education system, some research has shown that students with a growth mindset can greatly improve their success and achievement [41].

2.7. The Growth Mindset Stimulus Model

According to the previous research, the figure 2 illustrates the gamification model, which encourages learner to conduct their learning by using gamification elements. The learning behavior refers to the taking steps in the right direction guideline. Gamification activities conceptual model can be influenced by gamified activities [42]. The growth mindset is fostered by the positive feedback through cognition and motivation. The motivation can be stimuli by competency and leaderboard. The cognition could be influence by level [42].

The figure 2 shows the gamification workflow for growth mindset processes that influence the positive feedback and growth mindset by gamified activities. The learner's growth mindset is measured through feedback, level, motivation, their position on the leaderboard, and their competencies. The model shows the gamification activities can increase the likelihood of achieving the learning objectives by motivating students to learn. This illustrates the relationship between the stimulus activities and growth mindset processes [43]. Game activities can encourage the learner to practice their skills and their position on the leaderboard can enhance their pride and social acceptance. Motivation and cognition can enhance their performance through positive feedback and higher scores (GPA).

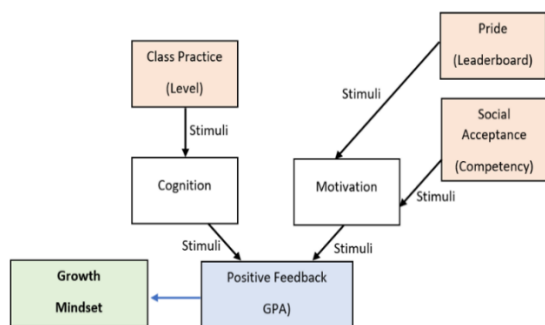


Figure 2: The Growth Mindset Stimulus Model [42]

3. Methodology

Having reviewed a scholarly source on a topic concerning mindset then mindset questionnaire is developed to classify participants into a different mindset characteristic. This research aims to link the mindset factors and gamification elements. The experiment design aims to cluster the mindset criteria and determine the relationships between the factors and the learning outcomes. The data collection uses a mindset questionnaire to facilitate comparisons with learner subjects. The pedagogy design gathers the university lecturer for the strategies class activity. The advisor experiences help to map the teaching or pedagogy style with gamification elements. Figure 3 illustrates the processes of data evaluation.

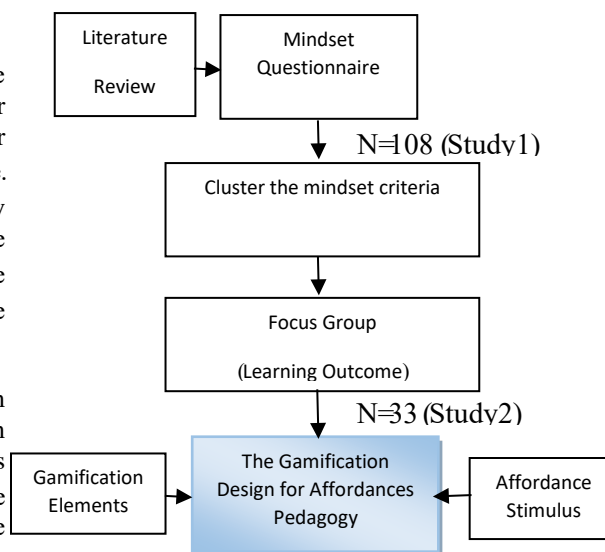


Figure 3: The Methodology of the gamification design for affordances pedagogy

3.1. Participants

Study1: According to factors finding, the participants in this study were 108 university Dhurakij Pundit University students. Participants included 72% from the Business faculty, 24% from the Creative Design faculty and 4% from the Journalism faculty all aged between 18 and 23. All participants in this study were volunteers. The average GPA was 3.55.

Study2: Then, the pedagogy design participants in this study were 33 university lecturers, randomly. The questionnaire design used the factors from the first findings. The average of experiences was 13 years. Normally, their teaching style were lecture and practical (50:50). They preferred to use gamification in the classroom and showed the score or progress to their student.

3.2. Clustering the mindset criteria: Factor Analysis (Study1)

This study uses the factor analysis. The mindset measures by questionnaires survey. The students may respond to questions about their opinions, which are all associated with the latent fix and growth variable mindset as below.

- Fix1: It is difficult for my intelligence /level of intelligence to change.
- Fix2: There are certain activities /subjects that I cannot be good at.
- Fix3: I think people do not have to try to do what they are capable of.
- Fix4: I can always learn new things, but I do not think that learning can increase my intelligence.
- Fix5: I am frustrated to see that people can do better than me.
- Fix6: If I have try something new and fail, I am not good at it.

- G1:I believe I can develop in all areas, albeit a little.
- G2:When I do something wrong, I feel that I would learn more from it.
- G3:I feel great when people see that I am good /talented, that means I am successful.
- G4:I am inspired by successful people.
- G5:I feel that I can help others to be successful.
- G6:If I try something new and fail, I want to repeat it until I can.

3.3. The Pedagogy Design (Study2)

The design process aims to link the pedagogical design and gamification elements and this paper focuses only on the factors affecting the mindset. The conceptual model can be employed in future work. The model can apply to the pedagogical context design includes the pedagogy plan.

The second findings from the university lectures show the relationship between factors.

- G1:The learneris skills can develop
- G2:Learneris practicing in the classroom
- G3:The level of learneris activities during learning
- G4-1:lectureris Comment for lesson activities individual
- G4-2:lectureris Comment for lesson activities to all of students
- Gamification:The class activities during learning
- Learn for smart:- Learn new things can increase the intelligence.

4. Results

4.1. Clustering the mindset criteria

The relationship of each variable to the underlying factor is expressed by the factor loading. The result of factor analysis, which deals with indicators of mindset, with twelve variables (opinions) and four resulting factors is shown below. Factor loadings can be interpreted like standardized regression coefficients, so the opinion in response 1 (Fix1) has a correlation of 0.72 with Factor 1. Five others, responses 2,3,4,5, and 6 (Fix 2,3,4,5,6), all representing fixed-attitude characteristics, are also associated with Factor 1. Based on the loading of the variables, the finding points high on factor 1, it could be considered as "Fixed Mindset".

However, opinions on questions 9 and 10 (Growth3 and 4), have high factor loadings on the other factor, Factor 2. They seem to indicate an external stimulus; that is, students are driven by other people, so Factor 2 would be classified as "Exogenous growth mindset." Similarly, Factor 4, is constituted by an answer of Growth 5 and 6 showing that students have positive feelings

whenever they help others, which is an external stimulus, hence Factor 4 would also be regarded as "Exogenous growth mindset".

Table 1:Component Analysis

Rotated Component Matrix ^a				
	Component			
	1	2	3	4
Fix1	.721	-.353	.071	.170
Fix6	.708	.174	-.121	-.193
Fix5	.690	.235	-.206	-.221
Fix2	.675	-.091	-.105	-.077
Fix3	.673	-.246	.091	.106
Fix4	.611	.131	.060	-.243
G3	.072	.784	.178	.011
G4	-.077	.638	.328	.221
G2	-.231	.164	.827	.081
G1	.106	.185	.796	.070
G6	-.107	.021	.176	.853
G5	-.167	.496	-.040	.647

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization. ^a

a. Rotation converged in 11 iterations.

Opinions on questions 7 and 8 (Growth 1 and 2) have strong factor loadings to Factor 3. Students agreed they are likely to do anything as a result of intrinsic motivation, thus Factor 3 is regarded as "Endogenous growth mindset".

Table 2:KMO test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.730
Bartlett's Test of Sphericity	Approx. Chi-Square	292.755
	df	66
	Sig.	.000

The Kaiser-Meyer-Olkin test (KMO-Table 2) is a measure of how appropriate the data are for factor analysis. The KMO value in this study was .730, which indicates that the sampling is appropriate. Bartlett's test is performed before applying factor analysis to check whether the data reduction technique can reasonably compress the data. In this study, the test statistic Chi-Square was 292.755 and the corresponding p-value was 0.000, which is less than the significance level (0.05). Thus, the data are suitable for factor analysis.

In column labelled (table3) "Extraction Sums of Squared Loadings. The" Total" column shows the Eigenvalues for each factor extracted which higher than 1. The second column "%of Variance" indicates the variance is explained by each factor (or component). The "Cumulative %" column shows the percentages of the total variance explained by the factors (62.418%).

Table 3: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.276	27.298	27.298	3.276	27.298	27.298	2.893	24.105	24.105
2	2.059	17.158	44.456	2.059	17.158	44.456	1.626	13.546	37.651
3	1.134	9.451	53.906	1.134	9.451	53.906	1.575	13.123	50.774
4	1.021	8.511	62.418	1.021	8.511	62.418	1.397	11.644	62.418
5	.857	7.140	69.558						
6	.694	5.782	75.340						
7	.643	5.358	80.697						
8	.599	4.991	85.688						
9	.538	4.486	90.175						
10	.457	3.809	93.983						
11	.391	3.255	97.238						
12	.331	2.762	100.000						

Extraction Method: Principal Component Analysis.

4.2. Learning Outcome: Mindset Assessment Processes

The results (Table 4) show that learning outcomes have a positive relationship with a fixed mindset ((Sig. .008) Fix3: Try to do what they are capable of doing. Fix4: Learn new things, but I don't think learning can increase my intelligence).

Fix3 refers to the affordances of learning that learners believe they can develop in all areas, even if only a little (Growth Mindset: G1). The results show a significant relationship between Fix3 and G1 (.016). Affordance of Learning is also positively related to Growth Mindset (sig. .001) that the learner believes they will learn more if they do something wrong (G2). Having a Fixed Mindset has a positive influence on G4, which refers to the learner being inspired by successful people (Sig. .000).

Table4 refers to what learners think about intelligence. They love to learn new things, but intelligence is fixed and cannot be increased by learning. The results show significant relationships between Fix4 and G1, G2, G3, and G4 (sig. .025, .013, .000, .002).

Table 4: Chi-Square tests

Variable	Value	df	Asymptotic Significance (2-sided)
GPA and Fix3	32.692a	16	.008
GPA and Fix4	26.695a	16	.045
G1 and Fix3	30.486a	16	.016
G1 and Fix4	28.788a	16	.025
G2 and Fix3	31.970a	12	.001
G2 and Fix4	25.368a	12	.013
G3 and Fix4	38.382a	12	.000
G4 and Fix3	50.059a	16	.000
G4 and Fix4	37.716a	16	.002

Having a Growth Mindset means believing in skill development, having a desire to learn more, seeing others, and being inspired by successful people. The mindset can promote the

fixed mindset, which refers to how people think about the nature of intelligence and learning.

The findings (table5) show the positive relationship between G1 and G2. The lectures believe that the students can develop and practice in the classroom (Sig. .015). The pedagogy design such as practical tasks (G1) will encourage with comment or feedback (G4) during the activities (Sig. .033, .026).

The level design for learners activities is positive impact on the feedback (G4) (Sig. .028) and Gamification strategy (Sig. .045). The class activities during learning such as gamification can encourage learners in terms of the new things can increase the intelligence (Sig. .039).

Table 5: ANOVA Tests (The lecture participants)

Variable	Sum of Squares	Df Between Groups	F	Sig.
G1 and G2	.742	1	6.576	.015
G1 and G4-1	.970	1	5.010	.033
G1 and G4-2	1.227	1	5.471	.026
G3 and G4-1	1.478	2	4.036	.028
Gamification and G3	3.976	2	3.436	.045
Gamification and learn for smart	3.480	2	3.625	.039

The results show in the table 6 that include the activities in the classroom. The participants illustrate the teaching experience to catch up the students' attention. The advisor experiences help to map the teaching or pedagogy style with gamification elements.

Table 6: Means comparison

Variable	Mean	Std. deviation
Gamification	4.36/5	.603
The feedback of progress	4.33/5	.816
The percentage level of progress(100)	37.33	29.49
The Practical activities	4.85/5	.364
The percentage of practical activities(100)	54.24	20.620
Inborn Intelligence	2.33/5	.924
Learning the New things can improve the intelligence	4.06/5	.747
Time in the Activities	4.15/5	.667
Time for Activity/each (minute)	41.66	18.819

Quest in the Activity	3.96/5	.728
Time for Quest/each activity (minute)	44.54	17.781
Social media feedback	3.60/5	1
Reward for the activity	4.15/5	.618
Percentage for reward/each activity (100)	15.64	12.36
Comment for individual	4.69/5	.466
Comment for all of students	4.54/5	.505

5. The Gamification Design for Affordances Pedagogy

From the previous study that map to the results in this study, the finding shows the relationship between factors. The significance of fixed mindset measures was positive impact through the growth mindset (Fig 4.) According to the research background and findings, the gamification mechanics can helps develop deeper insights into the capacity for pedagogy design. The findings support the ideas to develop the optimal psychology or flow theory [19] to suggests a remarkable activity in lesson plan. The gamification elements including points, badges, and leaderboards can derive her/his optimal experience [21]. For instance, the level and point can motivate people for engagement. An individual's capacity to concentrate will impact their ability to experience flow [21].

5.1. The Gamification Elements

The design process aims to link the pedagogical design and gamification elements and this paper focuses only on the factors affecting the mindset. The conceptual model can be employed in future work. The model can apply to the pedagogical context design includes the promotion of tasks in each faculty, increasing motivation and encouraging desirable learning behavior. Data are collected through classroom observations and stimulated recall interviews. The core characteristics of growth mindset pedagogy include focus on process, mastery orientation, persistence, and individual student support [44].

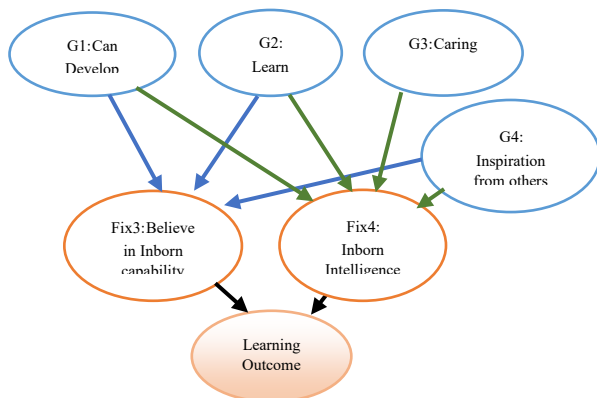


Figure 4: The relationships between factors

According to figure2, figure 5 shows the stimulus model for a growth mindset through motivation activities. The growth mindset factors are the stimuli, which can influence the learner's affordances.

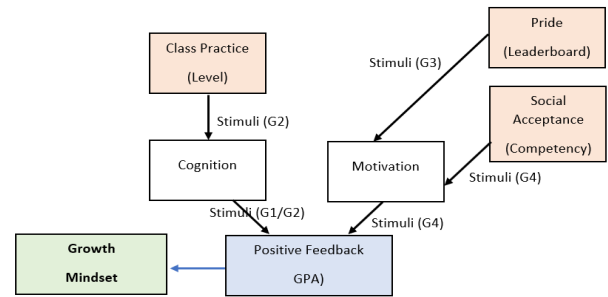


Figure 5: The Conceptual Gamification Affordances Design Model

5.2. The Affordances Pedagogy

The table 7 shows the findings that include the flow and pedagogy elements. These methods refer to the lecturers' experiences (Study 2) and students' feedback (Study 1). The gamification design for affordances pedagogy examines the literature review in terms of affordance, motivation and gamification. The research background aims to design the pedagogy elements below:

- Class assignment
- Quiz
- Group discussion
- Discussion
- Case study
- Play game

The pedagogy elements focus on the engagement that enable a practical mapping flow onto gamification. The approach enhances the student's interaction with the gamification elements such as points, badges, and leaderboard.

Table 7: The pedagogy elements of flow and gamification design (Adopted from Jones [45]).

Element of Flow	Manifestation in Pedagogy Elements
1. Task that we can complete	Class Assignment: The feedback of progress during class Game element: Point
2. Ability to concentrate on task	Quiz (test): The feedback of progress or show the score Game element: Point
3. Task has clear goals	Group Discussion: Quest in the Activity with friends and lecturer Game element: Badges
4. Task provides immediate feedback	Class Assignment: Comment for individual/Comment for all of students

	Game element: Leaderboard
5. Deep but effortless involvement	Discussion:social media/browsing the internet Game element: Leaderboard
6. Exercising a sense of control over their actions	Case Study:The Practical activities/The percentage of practical activities around 50% per class Game element: Badges
7. Concern for self disappears during flow, but sense of self is stronger after flow activity	Play game: The activity provides for a class environment as a simulation of life that refers to gamification such as reward, point and leader board in the class activity Game element: Badges, point and leader
8. Sense of duration of time is altered	Class Assignment: Time in the Activities/Time for Activity and Time for case study for each activity around 40-45 minute Game element: Leaderboard

6. Discussion/Conclusion

Gamification design for affordances pedagogy focuses on engagement that provides a practical mapping flow to gamification activities during instruction. This approach could enhance student interaction through points, badges, and a leaderboard. A learning mindset could be created using motivation and affordance pedagogy. Affordance refers to points, badges, leaderboards and ranks in gamification elements. This research aimed to determine the affordance mindset factors of gamification interactive systems. The results show the relationships between factors that lead to desired learning outcomes. In accordance with Sailer, M., Homner, L. examined research topic "The Gamification of Learning: a Meta-analysis", the meta-analysis supports the claim that gamification of learning works because the results showed significant, positive effects of gamification on cognitive, motivational, and behavioral learning outcomes [46]. Similarly, there is a large body of work that clearly shows that incorporating gamification into the instructional process can lead to better student learning outcomes and helps to increase student achievement [47]-[50]. The findings derived from the current research could be used in a gamification affordances design method. The use of the model could help to improve the learner's affordances. The pedagogical guide could encourage the learner in the classroom. Engagement enables meaningful learning, which includes the quality of student effort, student interaction, and their immersive experiences during activities. The framework idea is a theoretical construct used to shape pedagogy and learner behavior. It represents the reasons for learners' actions, desires, and needs during instruction. Future research could test and revise the gamification design for the pedagogy of affordances.

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