A REVIEW OF MOTIVATION THEORIES, MODELS AND INSTRUMENTS IN LEARNING ENVIRONMENT

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INTRODUCTION

Motivation is vital for students to face obstacles to achieving their aspirations. Consistent or natural motivation levels are not adequate to achieve academic and career rates. It takes a strong motivation to persevere in the pursuit of academic or life achievement. The goal of this paper is to perform a literature review to identify motivational theories, models, and motivational questionnaires that can support a technology-based learning environment. The results from the literature review discovered that there are several theories for measuring motivation, intrinsic theory, and extrinsic motivation theory, self-determination theory, ARCS model, social cognitive theory, and expectancy theory. Also, there are several questionnaires that are suitable for the learning environment such as Instructional Material Motivation Study (IMMS), Motivation Score for Questionnaire Learning (MSLQ), Student Motivation for Science Questionnaire (SMTSL), and Self-Regulation of Motivation Academic (SRAM).

Also discovered that motivation triggers motivation, intrinsic motivation, extrinsic motivation and amotivation theory. Besides, other factors that influence learning motivation include; ability to trust effort, inequality, and the nature of academic tasks. In this study, Mobile Augmented Reality (MAR) incorporates several factors to enhance motivation in learning science. The next section presents in detail the theories of motivation involving learning.

LEARNING MOTIVATION THEORIES

Basically, motivation is categorized as intrinsic motivation, extrinsic motivation and amotivation. Besides, many theories have been introduced to convey the concept and type of learning motivation. They are intrinsic and extrinsic motivation theory [16], self-determination theory (SDT) [16], ARCS Model [19], Social Cognitive Theory (SCT) [20] and Expectancy Theory [21].

Theory of Intrinsic and Extrinsic Motivation

Following [16], intrinsic motivation defines the best task, without external expectations, to fulfill one’s own needs. Challenges, curiosity, control, fantasy and control are the elements to trigger intrinsic motivation. Also, [22], [23] emphasize that intrinsic motivation and academic performance shared and profound connections. Intrinsic motivation leads someone to engage actively in educational activities in order to learn new things.
with their preparation without any external incentive contrary to the assumption of external rewards, products, or under any pressure [14], [15], [16], [24]. Much of these previous works have intrinsically motivated into game-based games that have learned [23], [24], [25], [26], [27] or their minds in studying what is considered important and what gives impact on teaching achievement [29], [30], [31]. Intrinsic motivation can spread positivity and create the knowledge gained to sustain long term. In contrast to intrinsic motivation, extrinsic motivation describes external activities that include gifts [10], [15], [7], [14], [24], [32], coercion [33], [34] and punishment [15], [33]. A person who wishes to succeed or excel to be accepted among fellows or understand any pressure cannot survive long [33]. Extrinsich motivation leads to dissatisfaction and reluctance in action [33], [33] claimed that extrinsic motivation should be introduced at an early stage of any process to attract attention so that it can evolve into intrinsic motivation as the learning process becomes more meaningful and immersive. There is a high chance that the individual will reach a saturation where he/she can no longer develop his/her intrinsic motivation or extrinsic motivation. At that point, amotivation occurs. Amotivation is the point at which intrinsic motivation and extrinsic motivation no longer exist [16], [17].

Intrinsic and extrinsic motivation is required to gain knowledge with own will or through the influence or attraction of external things [10], [15]. [33], [35], [36]. Thus, through the use of extrinsic motivation, students can stimulate intrinsic motivation, which has the potential to last longer. Learning is a simple process, only when students are interested and patient, and always motivated to seek knowledge [33]. Intrinsic motivation produces self-motivation in the search for identification; at the same time, extrinsic motivation is the goal of the study [33]. Therefore, students should always be encouraged to deal with the situation, even when it is challenging. They need to encourage themselves to maintain positive thinking and not to give up on challenges.

**Theory of Self-Determination (SDT)**

The theory of self-determination, also known as SDT, develops out of intrinsic and extrinsic motivation [10], [16], [37]. Intrinsic motivation reflects the inherent propensity of humans to include a range of mastery capabilities. In the meantime, extrinsic motivation represents the somewhat right scale of relative sovereignty. As a consequence, it can only represent external exploitation or self-regulation. As illustrated in Figure 1, the most notable feature of every intrinsic and extrinsic motivation is autonomy, competence, and relatedness, and it exists as SDT [38], [39].

Autonomy refers to individuality and freedom [16]; competence related to sensations of efficacy and performance in their pursuit and achievement; meanwhile, relatedness provides a sense of cohesion and importance in the learning environment [38], [39].

Knowledge will improve students academic success and motivation [39], [40]. As shown in Figure 2, SDT comprises of five mini-theories which include cognitive evaluation theory (CET), organismic integration theory (OIT), causality orientations theory (COT), basic psychological needs theory (BPNT), and goal contents theory (GCT) [16], [41], [42].

**Figure 2: Sub-Theories of Self-Determination Theory (SDT)**

Cognitive evaluation theory (CET) is a psychology theory designed to explain the effects of apparent consequences on internal motivation [43]. CET draws attention to the importance of autonomous roles and skills in promoting in-depth inspiration that is important to education, the arts, games, and many other fields. Ten years later, [44], [45] embraced organismic integration theory (OIT) and causality orientations theory (COT) as a sub-theory of SDT.

OIT is a spectrum of motivational states with three main parts. Motivational context assesses self-determined activity [39]. An important subject on the principles of organism integration is autonomy and the importance of internationalization. COT acts as self-interest and knows the price of output from the intervention, manipulates the focus that perceives the provision of additional benefits, income, and support as production and, eventually, as amotivational [44]. At this impersonal degree of amotivation, the emphasis is on performance. This explains the variations between self-determined actions and the world in a way that decides their fate. It is accompanied by the support of the basic psychological needs theory (BPNT) [46]. Human interest has established three essential psychological needs, their future autonomy, competence, and relatedness [46]. One study found that the need for satisfaction is necessary in order to make the most of growth, excitement, great success, and well-being among people [49]. Finally, goal content theory (GCT) shows the difference between achieving primary happiness and based on intrinsic motivation and extrinsic motivation [16]. Extrinsic motivation is given to fleeting riches and recognition, an intrinsic sense of self-development, and collective well-being [16]. Intrinsic motivation in the social context is significant to the teaching environment and the most important advantages for students. It focuses on basic and non-extrinsic objectives for better teaching results [16].

**Attention, Relevance, Confidence, and Satisfaction (ARCS) Model**

Human actions and emotions have a clear association with motivation [47]. Motivation is a positive force to deal with the awareness of approach and performance [48]. Students may be encouraged to make use of relevant, rewarding, and relaxing knowledge of the content [47], [49]. According to [19], ARCS model as a structured way of defining and discussing the inspiration for learning.
First, attention is essential to the development and maintenance of student commitment to learning [50]. Second, the relevance is essential to obtain confidence [50]. Confidence is related to the students’ thoughts and desires to keep working with happiness [50]. Finally, satisfaction is a feeling of self-fulfillment in reaching the desired goal. Satisfaction gained by improved learning methods and the amount of information that has been correctly learned. By the end of the day, satisfaction happens when the learned information is beneficial in actual circumstances [50]. The ARCS model is the researcher’s priority in assessing motivation in overall academic performance [51], [52], [53]. In line with [54], the impetus for interest can be very influential in engaging and lasting longer in learning. Figure 3 shows the factors and strategies of the ARCS model. According to academics, students may be easily distracted and enthralled by the use of secondary materials or by stimulating learning. Besides, the goal of information acquisition can be accomplished by helping to understand basic examples that are relevant to the real environment. Students will cultivate self-confidence and motivation by understanding and realizing the opportunities for success and commitment after becoming successful [55]. Finally, Satisfaction occurs when students can apply new knowledge, able to communicate, and make decision for projects and produce high-quality results in return [55].

Theory of Social Cognitive (SCT)
It has been used in several domain names, including education, communication, and psychology. The theory of social cognitive (SCT) represents knowledge through direct feedback, communications, remarks, and social media impacts [56]. The SCT was derived from the creation of context and information from social impacts. A research by [57] shows that social factors impact human beings, such as children. Continuous learning and building on the verbal communication between the reactions of the network and the internet. SCT portrays the interrelationship between behaviour, the dimension of the world, and the personal dimension. The behaviour may be related, and the outcome of each behaviour is different. SCT shows how human beings benefit from and maintain various types of behaviour and basic intervention strategies [58]. Environmental factors can impact humans and are classified as social and physical environments. The social atmosphere refers to one’s own family and friends at the same time as the physical environment refers to comfort and luxury [58]. Interactive learning with SCT allows students to benefit from self-confidence through practice.

Theory of Expectancy
The theory of expectancy was coined by [21]. This definition has been built mainly based on an operating environment to motivate workers. Subsequently, expanded and updated with the guidance of [59], [60]. Expectancy has a better sense of motivation and the way it applies to all of us [61], [62]. It assumed that there was a courting between the amounts of the attempt made and the total results and appreciation obtained from the attempt and results [61], [62]. This concept shows that rigorous effort can lead to higher results and rewards. Therefore, it should inspire them to make an effort, although they had to face difficulties [21], [63]. According to [21], effort, result, and valence are interlinked with human motivation. Initially, experts applied expectancy, instrumentality, and valence as a measure to prove the relationship [61], [62]. This theory is more to external rewards and appreciation. There are numerous efforts and perseverance required before earning praises [61], [62], [63]. In the beginning, students should be genuinely excited and agree with the fact that continuous performance with perseverance will lead to success [61], [62], [63]. The students must realize that the size of the award depends on the amount of effort they make to achieve something and then go for it [61], [62], [63]. When they receive appreciation for their efforts, they are recognized instrumentality. Finally, the potential value is entirely enormous and this is called valence [61], [62], [63]. At this point, the expectancy theory is achieved.

EXISTING MOTIVATION QUESTIONNAIRES
Researchers used a set of questionnaires to assess motivation in their areas of study. Previously, this study led four types of questionnaires to assess learning motivation, namely; Instructional Materials Motivation Survey (IMMS) [19], Motivational Strategies for Learning Questionnaire (MSLQ) [64], Student Motivation towards Science Learning Questionnaire (SMTSL) [54], and Self-Regulation of Academic Motivation (SRAM) [65].

Instructional Materials Motivation Survey (IMMS)
The instructional materials motivation survey (IMMS) is used to determine students’ motivation in learning. The constructs for this survey are derived from the ARCS model of motivation [55]. First of all, the Course Interest Survey (CIS) was designed to test students’ response to the instruction, and the IMMS instrument was the second group of surveys designed to assess students’ motivational reactions to self-directed instruction materials [19]. Both CIS and IMMS instruments assess the motivation level of students. Indeed, the difference is for the CIS instrument, the instructor performs or instructs the learning for students while for the IMMS instrument, it allows the students to conduct their self-paced learning. There are 34 items in the CIS instrument and 36 items in the IMMS instrument [66], [67]. Then the revised IMMS instrument was proposed by [68]. The original IMMS instrument contained 36 items while the revised version contained only 12 items. All elements have been validated and implemented to assess motivation in a technology-based learning environment [68].

Motivational Strategies for Learning Questionnaire
The Motivational Strategies for Learning Questionnaire (MSLQ) was proposed and proven its reliability by [69]. The motivation scales referred to the socio-cognitive version of motivation have covered three specific areas including value, expectation, and affect. Value includes the intrinsic and extrinsic orientation of the goal and the value of the task [69]. Expectation surrounds the learning controls. A momentary self-efficacy then affects the symptoms of anxiety [69]. The MSLQ instrument consists of six scales and nine sub-scales. The scales measure the level of motivation in the learning environment. Those six scales are
intrinsic goal orientation, extrinsic goal orientation, undertaking value, manipulate belief about studying, manipulate belief about learning and overall performance, and test anxiety. Besides, the nine sub-scales are rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, time and study environment management, effort regulation, peer learning, and help-seeking [69].

Science Learning Motivation Questionnaire
[54] designated a questionnaire for science learning and called it as student motivation for the science learning questionnaire (SMTSL). The motivational scales labelled as self-efficacy, active learning strategies, science learning values, achievement goals, and learning environment stimulation [54]. Self-efficacy ensures that students have faith in their skills and knowledge so that they can carry out a learning venture. Active learning by students using a wide variety of strategies to create new knowledge from their previous experience is energy learning. Students are motivated to study science based on a science learning interest observation and then a performance goal scale. This measure refers to the highest results in science learning, and the target of achievement refers to students’ sense of accomplishment in science learning as their success in technology learning has improved. Subsequently, getting associated with the stimulation of the environment refers to the learning environment, such as the classroom, and getting to know the content, training the instructors, and getting to know the consultation and interaction between college students, which increased their willingness to learn science. To date, this questionnaire is used to determine the motivation for various academic backgrounds of students, particularly in science learning.

Self-Regulation
Self-Regulation embeds with social cognitive theory [57], [70]. Self-regulated knowledge of the system produces self-thinking processes, feelings, and actions as a method of constructivist learning and directing [71], [72]. Self-regulation questionnaire encompasses six significant dimensions as shown in Figure 4. They include; Mastery Self-Talk (MST), Relevance Enhancement (RE), Situational Interest Enhancement (SI), Performance-Relative Capacity Self-Communicate (PST), Environmental Structuring (ENS), Self-Consequences (SC), and Performance Extrinsic Self-Talk (EST) [65].

**Figure 4: Self-Regulation Major Scales**

MST represents students’ thinking to encourage them to do better [65]. RE refers to the practice of self-awareness to identify more critical or relevant [65]. Meanwhile, SI in practice itself to develop an emotional empire of academic importance. For example, decorating student hobbies and well-being for a reasonable period [65]. PST refers to the emphasis placed explicitly on collective student attention to a variety of overall performance potentials for continuous performance and the tendency to perform them adequately [65]. The EST is a search technique for completing an activity. SC is designed to recognize and control extrinsic reinforcement to achieve specific efforts and ENS is designed to reduce off-the-job opportunities by reducing the likelihood of interruption.

**DISCUSSION AND CONCLUSION**
This paper explores many existing motivational theories, models, and motivational questionnaires. These theories play an important role in improving students learning performance. Previously, SDT and ARCS models have been widely used to measure motivation for the technology-based academic environment. IMMS questionnaire, MSLQ questionnaire, SMSTL questionnaire, and SRAM questionnaire are undoubtedly an ideal for assessing motivation in teaching and learning. However, there is a lack of technical factors or elements to measure learning motivation in a technology-based academic environment such as through the utilisation of Augmented Reality in education. Also, the implementation of theories such as social cognitive theory and the expectancy theory is still in its infancy within a technology-based academic environment. The whole idea is to look at the concepts that can develop learning motivation. Learning is a multi-layer development process that requires rules to achieve its objectives. As a result, our scholars have developed a conceptual framework as a guideline. This combination of theories is useful in the process of learning based on technology-based academic background and serves as a guide to the difficulties of understanding and visualizing information. Motivation is a notion associated with human action. Based on the theories and models discussed in this paper, the general discussion is on how to handle one’s emotions to continue to work towards their goals.

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