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ANTECEDENTS OF INTRINSIC MOTIVATION, METACOGNITION AND THEIR EFFECTS ON STUDENTS' ACADEMIC PERFORMANCE IN FUNDAMENTAL KNOWLEDGE FOR MATRICULATION COURSES

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ABSTRACT

Purpose - This study examined the interrelationships between a set of antecedent academic intrinsic motivations and metacognitive strategy such as goal orientation, perceived value and religiosity in Fundamental Knowledge for Matriculation courses (FKM). It also investigated the relationship between intrinsic motivation and metacognitive strategy on one hand, and students' academic performance on the other.

Methodology – A total of 471 second-year students (233 males and 238 females) were randomly selected to participate in a survey, following a stratified random sampling. Hypothesized relationships of academic intrinsic motivation, metacognitive strategy and their predictors were then tested by using Structural Equation Modeling.

Findings - Using bootstrapping (data-based resampling), the findings confirmed the proposed model which suggests that goal orientation and

perceived values contributed to students' academic performance directly and indirectly via intrinsic motivation and metacognition. Additionally, the findings also indicate that goal orientation was the main determinant of intrinsic motivation and metacognition, followed by perceived value. It was also found that religious motives within a perceived value construct contributed significantly to students' academic performance in a direct and indirect manner via intrinsic motivation and metacognitive strategy.

Significance – The study suggests the importance of goal orientation especially mastery and performance as well as perceived value and most significantly, religious motive in students' intrinsic motivation and their use of metacognitive strategies. The study also highlights the significance of intrinsic motivation and metacognitive strategies in students' academic performance. Hence, it is recommended that learners should be helped to adopt appropriate academic goals, and be encouraged to use metacognitive strategies to enhance their learning attainments.

Keywords - Intrinsic motivation, metacognitive strategy, goal orientation, perceived value, academic performance

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INTRODUCTION

Gagne and St. Pere (2002) quoted Edison's famous saying, "Genius is 1% inspiration and 99% perspiration" (p.21). There is also a common English proverb that says, "Whenever there is a will, there must be a way." These two phrases connote the human philosophical belief that intrinsic motivation plays a significant role in a human's life activities, especially in the learning process. Many educators, particularly developers among them, have been calling for an overall review of educational systems and learning processes to ensure that learners are not merely viewed as knowledge and information recipients, but rather active participants in the learning process. It is firmly believed that learning would not take place without the deep involvement and engagement of students. Burgeoning empirical studies have also asserted that when a learner is intrinsically motivated and volitionally interested in their learning activities, optimal learning will occur (Cerasoli, Nicklin, & Ford, 2014; DePasque & Tricomi, 2015; Grolnick & Ryan, 1987, Ryan & Deci, 2000a, 2000b).

Intrinsically motivated learners will endure difficulties and exhibit resilience when faced with academic challenges. Psychologists have referred to the inner arousal in a task or cognitive task engagement as intrinsic motivation. Interestingly, despite different definitions of intrinsic motivation, these definitions demonstrate that intrinsic motivation is a voluntary engagement in academic activities without external influences or pressure. Rather, it stems from the psychological pleasure of engaging in the tasks (Koestner, Zuckerman, & Koestner, 1987; Pintrich & Schunk, 2002; Ryan & Deci, 2000a; 2000b; Vallerand, Fortier, & Guay, 1997; Wu, 2003). According to self-determination theory, when an individual is voluntarily involved in a task or an activity without any external forces or under duress, he/she is acting of his/her own volition or has an intrinsic motivation (DePasque & Tricomi, 2015; Jovanovic & Matejevic, 2014; Negovan, Sterian & Colesniuc, 2015; Ryan & Deci 2000a).

On the other hand, psychologists contrast intrinsic motivation with another type of motivation that is labelled as extrinsic motivation (Cerasoli, Nicklin & Ford, 2014; Miendlarzewska, Bavelier & Schwartz, 2016; Ryan & Deci, 2000a, 2000b). Extrinsic motivation is a type of learning engagement that is not naturally triggered but instead, is sparked by an interpersonal or intrapersonal force. In other words, the engagement is not voluntary or of an individual's own volition in the achievement of a specific objective or goal (Deci, 1998; Miendlarzewska, Bavelier & Schwartz, 2016). If an individual's acts are based on extrinsic motives, he/she is not voluntarily motivated (wholly willing) to be involved in the targeted activity. Rather, they are obliged to do so by his/her inner or outside Thus, there are psychological conflicts and pressures forces. between what a person is doing and what he/she wants to do (Deci, 1998). Therefore, it is reasonable to argue that once a reinforcer is removed from the task, his/her involvement will either stop or the quality of the engagement will reduce and deteriorate due to lack of unification between the "want to" (personal interest) and "have to" (forced to do) (Deci, 1998; Vansteenkiste, Lens & Deci, 2006).

The conceptualization of intrinsic motivation consists of three types of intrinsic motivations: (a) intrinsic motivation to know, (b) intrinsic motivation to accomplish, and (c) intrinsic motivation to stimulate (Vallerand, Pelletier, Blais, Briere, Senecal, & Vallieres, 1992). The first type refers to the inner arousal to be involved in the learning task(s) to feel the satisfaction of gains from learning, to explore new ideas, and understand new things. Intrinsic motivation to accomplish is a type of intrinsic motivation that indicates the intention of an individual to voluntarily be involved in a learning activity because of the feeling that he/she has experienced when trying to achieve a particular goal(s). The final type, known as the intrinsic motivation to stimulate, is described as what an individual will experience when he/she tries to "experience stimulating sensations" such as sensory pleasure, aesthetic experiences and excitement which emerge from his/her involvement in the tasks (Vallerand et al., 1992, p.601). Interestingly, many empirical studies have suggested the existence of a strong relationship between an intrinsic motivation on the one hand, and performance, information processing, creativity, deep information processing, reading achievement, the reduction in school dropouts, resilience and the quality and quantity of learning acquisition on the other (An, Song & Carr, 2016; Fidan & Oztürk, 2015; Gottfried, 1985, 1990; Lloyd & Barenblatt, 1984; Moneta & Siu, 2002; Spada & Moneta, 2014; Vallerand & Bissonnete, 1992; Weidinger, Spinath & Steinmayr, 2016).

Metacognitive strategy is also considered as one of the fundamental pillars of learning excellence and academic performance (Young & Fry, 2008). This is because metacognition helps a learner to properly plan, organize, regulate and calibrate his/her cognitive processes and intellectual abilities. Metacognition is categorized into two major components, namely metacognitive knowledge and metacognitive regulation. The former component has been described as what a learner knows about his/her own cognitive knowledge. In this instance, it comprises declarative procedural and conditional knowledge. However, metacognitive regulation refers to the learner's actual activities to foster learning and memory such as planning, monitoring and evaluating (Young & Fry, 2008). Studies on these two components of metacognition have shown that they are strongly correlated with learning advancement, intrinsic motivations, building a linkage between prior and new knowledge, the adoption of appropriate strategies based on the demands of a task, reading comprehension and learning outcomes (Young & Fry, 2008).

Additionally, intrinsic motivation has also been found to have a strong relationship with metacognitive strategies (DePasque & Tricomi, 2015; Efklides, 2011; Pintrich & DeGroot, 1990). It is empirically suggested that intrinsically motivated students are more academically involved, and employ productive and meaningful

metacognitive strategies compared to non-intrinsically motivated counterparts. According to Pintrich and DeGroot (1990), knowledge of cognitive and metacognitive strategies is not the sole predictor of learners' academic success, but intrinsic motivation plays a significant role in their achievement and the type of metacognitive strategies used. They also contend that intrinsically motivated learners are those who engage in metacognitive strategies by monitoring, planning and continually evaluating their progress and performance. Thus, these studies have clearly demonstrated that intrinsic motivation is correlated with self-regulation and that metacognition has been considered as one of the major pillars of self-regulated learning.

Nevertheless, it has been suggested that there are some psychological needs that must be satisfied before intrinsic motivation can be elicited (Froiland & Oros, 2014; Ryan & Deci, 2000a; 2000b; Skinner & Belmont, 1993; Vansteenkiste, Lens & Deci, 2006). For instance, goal orientation and perceived value are also determinants of intrinsic motivation (Eccles & Wigfield, 1995; Ferrer-Caja & Wiess, 2000; Pintrich, Marx, Boyle, 1993; Ryan & Deci, 2000a). The degree to which learners' fundamental psychological desires and environmental factors are fulfilled or ignored in a school context has also been echoed in their self-system processes (attitudes and belief about themselves) (Skinner & Belmont, 1993) and consequently reflected in their engagement in their learning activities. This assumption has been empirically studied and findings indicate that if these antecedent variables (goal orientation and perceived value) are satisfied, learners tend to be more intrinsically motivated and willing to engage in learning activities for the sake of knowledge itself (Deci & Ryan, 1985; Ferrer-Caja & Wiess, 2000; Ryan & Deci, 2000a). In relation to perceived value, studies (Derryberry, Crowson, & Lomax, 2004; Eccles & Wigfield, 1995; Husman & Len, 1999; Husman, McCann & Crowson, 2000; Pintrich, Marx, & Boyle, 1993) found a strong relationship between perceived value and intrinsic motivation. These studies demonstrate that the perceived value construct which consists of utility and instrumentality or endogenous instrumentality and exogenous instrumentality could be viewed as extrinsic motivations as tasks are done due to their utility; however it was also found that both types of perceived value factors were highly correlated with intrinsic motivation.

Instrumentality, an essential portion of perceived value refers to a learner's perception that the completion of an academic task will increase the probability of achieving a specific goal in the long term. An example of this could be taking an Arabic language course to become an Islamic scholar or taking a psychology course to become a pioneering psychologist (Eccles & Wigfield, 1995; Eccles & Wigfield, 2000; Husman, Derryberry, Crowson, & Lomax, 2004; Husman & Lens, 1999). In contrast, utility or exogenous instrumentality means the significance of a task in hand for future goals such as taking an Arabic class to fulfil a requirement for a degree programme or to fulfil an interest in the Arabic language. Hence within this view, it is a means to achieve a specific goal in the near future or for immediate benefits.

Research also suggests that students with greater perceived value (instrumentality or utility), and learning goal orientations use appropriate cognitive and metacognitive strategies to regulate and accomplish their learning activities, acquire higher skills, engage in academic tasks and develop their intellectuality (Eccles & Wigfield, 1995; Pintrich, Marx, & Boyle, 1993; Pintrich, 1999; Wolter & Rosenthal, 2000). For instance, Sansone, Weibe and Morgan (1999) found that learners who believed that tedious academic tasks were useful and important for the future were more prone to employ effective cognitive and metacognitive strategies to tackle boring activities compared to their counterparts who did not value the tasks. As such, the relationship between perceived value, on one hand, and academic performance, on the other, could be mediated by intrinsic motivation and metacognition (Eccles & Wigfield, 1995; Husman, Derryberry, Crowson, & Lomax, 2004; Husman & Lens, 1999; Husman, McCann, & Crowson, 2000; Wigfield & Eccles, 2000). However, although these studies emphasize the importance of perceived value and its influence on students' use of metacognitive strategies and enhanced intrinsic motivation and performance, the relationships among these variables remain relatively unexplored.

For Muslims, Islam is an abundant source of inspiration which stimulates and encourages them to seek knowledge and wisdom. This inspiration intrinsically motivated earlier Muslim scholars such as Ibn Rushdi, Ibn Sina', Al-Gazali, Ibn Khaldoun, and others to innovatively and intrinsically engage in every aspect of knowledge without any other external forces. Rather, they obtained their inner pleasure from these activities because they were obeying the command of Almighty Allah to seek knowledge. This intrinsic motivation and meaningful involvement in seeking knowledge galvanized earlier Muslim scholars to rigorously contribute to every aspect of knowledge and innovation because their ultimate goal was not to acquire worldly benefits but rather to follow the commands of Allah and gain His eternal rewards. Although in Islam, seeking knowledge is a fundamental requirement for a Muslim, empirical studies that examine the role of intrinsic motivation and metacognition have not been given much attention. Therefore, in this study, within Structural Equation Modeling (SEM) framework, the researchers tested direct effects of goal orientation and perceived value on students' academic performance and indirect effects via intrinsic motivation and metacognitive strategy.

Goal Orientation

Starting from the second-half of the last century and precisely from the 1980s, a plethora of research studies and theories have suggested a strong relationship between students' goal orientation, intrinsic motivations and cognitive engagement in school tasks. Specifically, particular attention has been paid to the three-goal perspective. These goals have been termed as task-orientation, ego-orientation and performance avoidance (Elliot & Harackiewicz, 1996; Elliot & McGregor, 2001), or mastery goal, performance goal and work avoidance goal orientation (Elliot & Church, 1997; Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000). These goals basically investigated whether learning was taken on by learners as an end in itself or as a means to achieve a specific goal such as recognition, approval, positive evaluation by others or good grades (Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar, 1991; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010).

Goal understanding theories of achievement have identified different types of goal orientation among students to identify the causal relationships between an individual setting goals and his/ her behaviour towards achieving those goals. According to social cognitive theories (Bandura, 1986, 1991b; Zimmerman, Bandura, & Martinez-Pons, 1992), goals promote people's cognitive and affective reactions (non-cognitive behaviours such as motive and emotion) to the highest level of performance outcomes because goals determine the requirement for personal success and attainment. Although many theories of motivation such as self-determination (Ryan & Deci, 2000a), self-efficacy (Bandura, 1986), and competence (White, 1959) have conceptualized intrinsic motivations differently based on different points of view, they all emphasize that intrinsically motivated activities are undertaken when learners have adopted a mastery goal orientation which enhances the activities and predicts later performance (Butler, 2000). In order to understand how teachers can stimulate students' intrinsic motivation in their learning acquisition and direct their cognitive processes, they must know the goals students set for themselves and what they want to achieve. According to Butler (2000), "if one wants to understand what people are doing, a fruitful starting point is to understand what they are striving to achieve" (p.164).

The three types of goals mentioned are assumed to represent not only task and ego orientation but also work avoidance. The mastery goal, according to researchers, is assumed to orient people towards new skills, motivate them to try and understand their work, improve their level of competence (Hidi, 2000), maintain positive effects, ensure they use effective strategies, increase task performance (Molden & Dweck, 2000), promote intrinsic motivations (Forrer-Caja & Wiess, 2000), support self-determination (Ryan & Deci, 2000a, 2000b) and enhance academic performance (Huang, 2011; Richardson, Abraham & Bond, 2012).

In addition to these features, mastery goal orientation can facilitate an individual to persist in the face of difficulty or failure, or make an effort, and take risks in pursing one's targeted objective. It has been found that students who are mastery goal oriented are predicted to always have ambition to acquire a new skill, are able to understand their ingenuity, improve their self-efficacy, and persist in the face of difficulty or failure. They are able to recognize that making an effort, taking risks and having intrinsic motivation in learning activities are elements of achieving success (Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar, 1991; Elliot & McGregor, 2001).

In contrast, performance goals have been postulated to lead individuals to seek positive evaluation of their abilities and hence avoid negative ones (Harackiewicz et al., 2000), such as using superficial learning strategies, minimizing effort (Elliot & Harackiewicz, 1996; Harackiewicz et al., 2000; Meece & Holt, 1993) and undermining problem-solving and creative thinking (Butler, 2000; Doménech-Betoret & Gómez-Artiga, 2014). It was also found that performance goal orientation negatively correlates with strategy of mastery (r = -0.44, p < 0.001), interest enhancement (r = -0.19, p < 0.05) and environmental control (r = -0.29, p < 0.001) (Wolters & Rosenthal, 2000). Researchers affiliate these negative behaviours with performance goals even though less than half of the published empirical research support the notion proposed by Elliot and Harackiewicz (1996).

There have been studies that argue performance goals are oriented towards maladaptive learning behaviours. These studies have documented that performance goals are accompanied by work avoidance, undermine intrinsic motivation and are deleterious to students' deep involvement and subsequently, their performance (Poondei, Koul, & Sujivorakul, 2013; Remedios, Kisaleva, & Elliot, 2008). However, recent studies have denied allegations against performance goals. For instance, an experimental study conducted by Elliot and Harackiewicz (1996) on 84 undergraduates has found that performance goals were not harmful or deleterious to intrinsic motivation and persistence unless it was accompanied by avoiding competence. Moreover, their study also reports that even though performance avoidance participants were found to struggle to perform as well as their mastery and performance counterparts, these participants also exhibited many positive behaviours that some of the mastery and performance orientation participants demonstrated. Their intrinsic motivation decreased due to their fear of failure and reluctance to face challenges, resulting in them minimizing their efforts, or even displaying anxiety, similar to performance approach participants; these participants were also found to display high intrinsic motivations (Elliot & Harackiewicz, 1996). Thus, it was found that the idea that performance avoidance undermines intrinsic motivation was not due to learners' inability to perform a task, but rather it was inspired by a materialistic mentality or "by creating internal constraints that undermine autonomy, and evoke evaluation anxiety" (Butler, 2000, p.185). Consistent with previous studies, Elliot and Church (1997) also found that performance avoidance was related to a maladaptive learning approach through undermining intrinsic motivation, and decreased task involvement and academic performance. Specifically, Elliot and Sheldon (1997) discovered that avoidance motivation was correlated with decreased of self-esteem (r = -.30, p < .05), lower well-being levels (r = -.39, p < .0001), personal control (r = -.22, p < .05), life satisfaction (r = -.32, p < .0005) and perceived competence (r = -.32, p < .0005). Nevertheless, other studies have reported that both mastery and performance orientations could also generate and maintain intrinsic motivation as long as the processes and outcomes of the achievement motivation were in accordance with one's targeted goals (Butler, 2000).

Hence, striving for relevant skills and information would depend largely on which learning tasks learners believe would provide accurate answers to their questions. For mastery-oriented individuals, they would be more curious to learn when success would depend on acquiring a new skill and understanding it, provided the environment is conducive. On the other hand, for performance goal oriented individuals, knowledge would be meaningful and interesting as long as the environment provides information relevant to the competence assessment or when people often praise them on their achievements (Butler, 2000). Therefore, Butler (2000) rejects the assumption that performance goals generally weaken and sabotage intrinsic motivation unless it (performance goal) is accompanied by perceived incompetence and task involvement is low.

The relationship between the achievement of goals and intrinsic motivation rests on the assumption that before individuals strive for an object, there must be a meaning that they ascribe to that object. If the value is to achieve the goal as an end and for its own sake, they will get deeply involved, and struggle without external enforcement or encouragement. However, if it is a means to an external end (such as obtaining good grades or gaining approval), the level of engagement will be low and the effort will be minimized. Therefore, the goal that an individual achieves becomes the prime determinant of the level and nature of involvement.

Consistent with the long-standing expectancy and value model, this approach contends that mastery and performance goals can also facilitate achievement when they are associated with the positive expectation of success (Dweck & Leggett, 1988). A research conducted by Barron and Harackiewicz (2001), for instance, shows a significant and positive correlation between mastery and performance goals (r = .31, p < .05). Accordingly, the findings from

this study also support the possibility of a multiple goals perspective which can be adopted simultaneously to enhance motivational orientation and learning outcomes. Elliot and Church (1997) also report that both goal orientations (mastery and performance) must be adopted when there is a greater perceived competence and intrinsic motivation.

However, researchers such as Durik and Harackiewicz (2014) and Elliot and Church (1997) observe that students who endorse both goals are most likely to attain both outcomes. Therefore, it is suggested that mastery and performance goals can work hand in hand to foster students' academic performance and enhance their intrinsic motivations, both in the short and long term.

Perceived Value

Many theorists have offered broader definitions of task value. Battle (1966) defines task value in terms of a subjective attainment value (the importance of attaining a goal or achieving an objective). Value belief, according to Pintrich, Marx and Boyle (1993), refers to "the student's instrumental judgments about the potential usefulness of the content or task for helping him or her to achieve goals such as getting into college or getting a job" (p.183).

In relation to the motivational consequences of this value system, it is suggested that value affects the valence of specific activities or situations for an individual and, therefore, is linked to action whether by approaching or avoiding it (Eccles & Wigfield, 1995). Task value reflects students' beliefs about whether the materials or skills they are learning or acquiring are useful, important or intrinsically fascinating. Although it is believed that perceived value is a relatively individualistic and extrinsic motive, "it is a very crucial determinant of involvement, intrinsic motivation and also success or failure in a task partly depends on it" (Eccles & Wigfield, 1995, p.216).

Husman, Derryberry, Crowson and Lomax (2004) divided perceived value into two categories. The first category refers to utility or exogenous instrumentality. They posit that "it relates to a task that is useful for jumping hurdles but not necessarily useful for fully realizing a long-term goal" (p.5). An example of this utility value

is when a student is found to be intrinsically motivated in a course because it is a requirement to enter college or any other higher institution. The second category of perceived value is related to instrumentality or endogenous instrumentality when the outcome in a present task is instrumental to achieving valued future goals. More precisely, a learner may adopt this type of perceived value when involvement in a task is due to a long-term benefit and goal, such as being intrinsically motivated to learn mathematics because he/she wants to become an engineer (Husman et al., 2004).

According to researchers in the field of perceived value (Eccles & Wigfield, 1995), the perceived utility value of a task or an activity may be influenced by more than merely an individual's competence or instant enjoyment, but may also be influenced by broader cultural values, gender-role stereotypes and so on. Moreover, utility value is determined by an individual learner's belief in the usefulness of the task, particularly for its immediate usefulness, (e.g., to help them cope with college) or in their degree major (e.g., for course improvement) or even for their career and life in general (Pintrich, 1999). Studies (Eccles & Wigfield, 1995; Husman, 1999; Husman et al., 2004) have found that long term benefits (instrumentality) enrich intrinsic motivation and persistence compared to short term benefits (utility). With respect to students' effort or level of cognitive engagement, Pintrich and DeGroot (1990) also document a positive relationship between students' perceived value of academic tasks and their use of cognitive and self-regulatory strategies.

Psychologists also consider that making sense of the environment, overcoming challenges, enjoying individual self-efficacy, exercising control and valuing learning outcomes are major predictors of intrinsic motivation and involvement (Deci & Ryan, 1985; Hidi, 2000). In accordance with this view, Ainley (1998) found two major variables that facilitate students' involvement in learning activities; these are satisfaction (positive effect) and opportunity (value for their future life). Eccles and Wigfield (1995) found in their study on high school adolescents that both intrinsic motivations and perceived task value and utility of the subject area predicted their future enrolment plans. This view is supported by the findings reported by Miller, Behrens, and Greene (1993) that perceived value was moderately correlated with persistence and effort expenditure (I = .51, p < .0). Accordingly, such findings suggest that to assist students with getting

deeply involved in learning activities, instructors must ensure that learning materials that are created should fulfil two criteria; feeling and value (Ainley, 1998).

Similarly, Pintrich (1999) and Husman, McCann and Crowson (2000) also found a positive correlation between value belief, cognitive strategy and motivational factors such as rehearsal, elaboration, organizational strategy use, cognitive engagement, intrinsic motivation and goal orientation. These findings suggest a strong link between these constructs but an empirical study is needed to investigate them holistically.

Religious Motive

Religious or spiritual rewards are one of the major determinants of Muslims' intrinsic motivation towards learning and embarking on academic exercises. Muslims strongly believe that the inclination to learn is not just for material purposes or should not be perceived as an instrument of dominance and control over others, but rather, it is a desire and tendency to fulfil religious requirements. The perception of the obligation to seek knowledge energized early Muslim scholars to be active participants in all fields of knowledge. According to the Islamic perspective, seeking knowledge and knowledge discovery are obligatory and is regarded as a form of worship, with enormous spiritual rewards. In the Holy Qur'an, Allah says, "Allah will exalt in degree those of you who believe, and those who have been granted knowledge. And Allah is well-Acquainted with what you do (Al-Qur'an, 58:11). He also says, "Say: are those who know equal to those who know not? It is only men of understanding who will remember (Al-Qur'an, 39:9). Moreover, Prophet Muhammad (May the peace and blessings of Allah be upon him) also emphasized in various Hadiths, the importance of knowledge and intellectuality. On the authority of Abu Huraira (may Allah be pleased with him), it is reported that Allah's Messenger (may the peace and blessings of Allah be upon him) said, "When the son of Adam dies, his acts come to an end but three: recurring charity, or a kind of knowledge by which people derive benefit, or a pious son who invokes Allah for him" (Abdul Rahim, 1987).

These spiritual rewards evidenced in the Qur'an and Sunnah energize and stimulate Muslims' intrinsic motivation, instigate and

strongly influence them to the extent that they travel long distances to seek knowledge from various scholars. Indeed, there is a basis for arguing that intrinsic motivation, which is generated from spiritual rewards, inspires and spurs Muslims to use various cognitive and metacognitive strategies such as rehearsal, elaboration, organization, reflection, critical and creative thinking. Since religiosity is considered to be a spiritual reward, in this study it is formulated with a perceived value construct. Unfortunately, there are no empirical studies that have specifically examined the role of religiosity especially of Islam in intrinsic motivation, metacognition and performance. Therefore, this study attempts to explore the intrinsic motivation model by selecting predetermined predictors of intrinsic motivation, some of which have been investigated separately in previous studies such as goal orientation as well as perceived value which have not been widely researched empirically, especially in terms of the religiosity factor. It also seeks to test the relationships of intrinsic motivation and metacognition strategy with performance of students at the Matriculation Centre of the International Islamic University Malaysia.

METHODOLOGY

A sample of 471 second-year students from the International Islamic University Malaysia, Matriculation Centre, Petaling Jaya participated in this study. They were randomly selected and voluntarily participated in answering the questionnaires. The Matriculation Centre of the International Islamic University Malaysia is a pre-university institution where students are introduced to basic courses, particularly language and bachelor degree prerequisites, which will qualify them to undertake undergraduate programmes in various specializations. Among the students, 233 were (49.5%) male and 238 (50.5%) were female. As for the respondents' academic specializations, 21.2% (n=100) of the respondents were Science majors while 19.1% of the students (n=90) were Law and Economics students. In addition to this, 17.0% (n=80) of the participants were selected from IRKHS and Architecture, while only 6.6% of respondents (n=31) were selected from ICT. The age of the participants ranged between 17 and 20 years.

PROCEDURE

Instrumentation

In this study, two instruments were used. The first instrument, which consists of 26 items, was adopted from previous studies. It was used to assess students' intrinsic motivations, goal orientations and metacognition. The instrument was validated and used extensively in many studies and in various class settings. The second instrument was self-constructed. It pertained to a perceived value construct such as instrumentality, utility and religiosity. The intrinsic motivation scale was adopted from Vallerand et al. (1992) and consisted of 12 items. The instrument was designed to examine students' intrinsic motivation (to know, to accomplish and to stimulate). The original version of the scale was translated from French to English by the constructors themselves and was validated by using Cronbach's alpha. The Cronbach's alpha for three intrinsic motivation sub-scales ranged between .62-.86. The goal orientation scale was adopted from Elliot and Church (1997). It consisted of 18 items, designed to measure students' achievement goal orientations. The internal consistency reported by Elliot and Church (1997) for mastery, performance and work avoidance goal orientations were .91, .89 and .77, respectively. Another metacognitive instrument that was used in this study was adapted from Duff (2000). It consisted of six items out of a total of 44 items that assessed students' experience of learning. The internal consistency (Cronbach α) of the six factors ranged from .73 to .83.

The second part of the questionnaire was self-constructed (selfdeveloped) by the researchers. The construction of the items was based on the perceived value theory and was obtained from literature and related studies. It comprises of issues of utility, instrumentality and religiosity. The first draft of the questionnaire that comprised utility, instrumentality and religiosity led initially to 27 items and was validated by using various methods such as expert comments and a data reduction technique (exploratory factor analysis). The Cronbach's alpha for the three factors were .67, .78 and .66 respectively. The questionnaire was then distributed to the respondents and they were asked to define the degree to which they agreed or disagreed with each item in the questionnaire, and to rate each item from 1 to 7 in a Likert-style scale. Furthermore, the students' academic performance was measured via their CGPA in fundamental knowledge for matriculation (FKM). Structural Equation Modeling (SEM) was then used to examine the complex and interconnected relationships among the variables concerned. SEM is a powerful statistical method, not only in its ability to examine a complex relationships precisely, but also in its capability to examine both direct and indirect relationships.

Proposed Model

Based on the literature review and conceptual framework discussed above, a direct relationship between goal orientations and perceived value on one hand, and academic performance on the other, was proposed. However, it was also proposed that there exists an indirect relationship between goal orientation and perceived value with academic performance through intrinsic motivation and metacognition. The model proposed to examine the contribution of intrinsic motivation and metacognition as the mediator variables between exogenous constructs (goal orientation and perceived value) and students' academic performance.



PRELIMINARY ANALYSIS

Multivariate analyses share many preliminary assumptions that should be satisfied before they can be meaningfully used and for their findings to be statistically and practically generalized. Among the most important of these assumptions are normality and linearity. The assumption of normality was tested using Skewness and Kurtosis to ensure that the employed data was normally distributed. Tabachnick and Fidell (2007) have indicated that the assumption of normality is very significant because the residuals are also normally distributed and independent. An examination of normality suggests that the assumption was held. Further analysis through the Kolmogrov-Smironov test also suggests that the test was statistically insignificant which meant that the normality assumption was met. Moreover, Shapiro-Wilk also supports the assumption of normality. In addition to these tests, the multivariate normality was also tested using Mardia's coefficient provided by the AMOS software. The result of the test shows a figure of .073 with a normalized estimate of .042, suggesting that the multivariate normality assumption was tenable. According to Bentler and Wu (2002), a normalized estimate greater than 3 will lead to important standard errors and chi-square biases. Hence, no adjustment of non-normality is needed and regular \mathbb{I}^2 can be used for testing model fit. Based on these results, it can be concluded that the normality assumptions were tenable and the parametric data analyses were justifiable.

On the other hand, a linearity assumption was explored through a residual plot (SRED) in a standard multiple regression analysis. Visual inspection of the scatterplot suggests that the scores were visually scattered with no distinct pattern, which indicates that the assumption of linearity was met. It is worth mentioning that checking the assumption of linearity is very crucial due to the fact that deviation of the score from linearity would affect the magnitude of the correlation coefficient because Pearson's r only captures the linear relationship (Schumaker & Lomax, 2010; Tabachnick & Fidell, 2007) and suggests that estimates of model fit and its respective standard errors become biased (Bentler & Wu, 2002).

Furthermore, prior to assessing the structural model, the intercorrelation among the exogenous variables (predictors) was examined. Multicollinearity, according to Kline (2002), is a strong

connection among exogenous variables that might lead to model biasness. The researchers examined multicollinearity of the data by using a variance inflation factor (VIF) in multiple regression. The analysis of VIF suggests that collinearity is not a concern of this model since the value of VIF for all exogenous variables involved was below 3.0 as has been suggested by Diamontopoulous and Siguaw (2006). The satisfaction of these assumptions encourages the researchers to continue with the Structural Equation Modeling to test the proposed model.

Table 1

Variables	VIF	
Academic Performance	1.53	
Know	1.62	
Accomplish	2.43	
Stimulate	2.36	
Mastery	1.82	
Performance	2.04	
Avoidance	2.41	
Utility	1.92	
Instrumentality	1.96	
Religiosity	1.98	
Metacognition	1.20	

Multicollinearity of Factors

DESCRIPTIVE ANALYSIS

Category frequencies of the demographic variables which are: gender, age and Cumulative Grade Point Average (CGPA), for the sample of 471 students are shown in Table 2. The table shows that the goal of an equal size between genders was somewhat achieved. The data also shows that almost half of the respondents (n=233, 49.5%) were male students, and slightly more than half of the respondents were females (n=238, 50.5%).

For respondents' age, more than two-thirds of them (n=343, 72.8%) were 19 years old, while 14.2% (n=67) were 20 years old. Only

7.0% (n=33) of the participants were 18 years, while 5.9% (n=28) of the students were 21 years old. As for the respondents' CGPA, Table 2 shows that the majority of participants, i.e., nearly 50% (n=209), reported a CGPA ranging between 2.50 to 2.99. 29.1% students (n=137) reported CGPAs ranging between 3.00 to 3.49; 12.5% (n=59) reported a CGPA ranging between 2.00 to 2.49; and 9.8% (n=46) reported a CGPA ranging between 3.50 to 4.00. The least reported CGPA ranged between 1.75 to 1.99, with 20 respondents (4.2%).

Table 2:

	Characteristics	n	%
Gender	Males	233	49.5
	Females	238	50.5
Age	18 years	33	7.0
	19 years	343	72.1
	20 years	67	14.2
	21 years above	28	5.9
CGPA	1.75-1.99	20	4.2
	2.00-2.49	59	12.5
	2.50-2.99	209	44.4
	3.00-3.49	137	29.1
	3.50-4.00	46	9.8

Distribution of Respondents according to their Characteristics

Bivariate Correlations

The analysis of the Pearson correlation found the existence of a substantial correlation among the constructs of the study. Table 3 shows that the intrinsic motivation factor substantially and statistically correlated with academic performance. For example,

	1	2	3	4	5	9	7	8	6	10	11
Academic Perfor- mance											
Know	.33**										
Accomplish	.39**	**69.									
Stimulate	.23**	.63**	.63**								
Mastery	.61**	.39**	39**	.42**							
Performance	.42**	.29**	.29**	.34**	.45**						
Avoidance	33**	25**	23**	26**	39**	51**					
Utility	.29**	.31**	.31**	.35**	.61**	.37**	.25**-				
Instrumentality	.19**	.40**	.40**	.43**	.67**	.43**	.34**-	.74**			
Religiosity	.25**	.30**	.30**	.23**	.35**	.25**	19**	.29**	.33**		
Metacognition	.38**	.38**	.41**	.47**	.43**	.31**	.23**_	.39**	.41**	.34**	
Means	6.03	6.28	4.99	5.26	3.84	4.44	5.07	4.94	6.47	7.20	6.31
S.D	2.34	2.43	1.89	2.36	2.14	2.36	2.25	2.17	2.57	2.57	2.28
V = 471 ** p < .001 and	d * p < .05										

Correlation Coefficient, Means and Standard Deviations of the summated variables in the study

Table 3

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intrinsic motivation to know (r = .33), to accomplish (r = .39) and to stimulate (r = .23) significantly and statistically correlated with performance, all at .001. Furthermore, metacognition was also found to be positively and statistically correlated with academic performance (r = .38) and intrinsic motivation factors such as to know (r = .38), to accomplish (r = .41), to stimulate (r = .47), mastery (r = .43) and performance (r = .31) but negatively correlated with avoidance (r = -.21), all at .001. Moreover, there were also moderate to high correlations between performance on one hand, and utility, instrumentality, religiosity and metacognition on the other. As shown in the table, performance was also statistically correlated with utility, instrumentality, religiosity and metacognition at r = .29, r = .19, r = .25, and r = .38, respectively at alpha .001.

RESULTS OF THE STRUCTURAL EQUATION MODEL

The model was statistically tested using an Analysis of Moment Structure (AMOS) version 20.0 (Arbuckle & Wothke, 2011). Starting with the hypothesized model in Figure 1, the Chi-Square goodness-of-fit test, along with other fit indices was used to determine the accuracy of the hypothesized model. The baseline structural model shows χ^2 (73 = 471) 186, p = .001 (GFI = .93, AGFI .91, IFI .90, CFI = .93 and RMSEA = .059, $\chi 2/df$ (3.50 < 5.0). This initial result, before performing a bootstrap analysis, suggests a reasonably good fit. The result suggests that goal orientation positively and significantly predicted intrinsic motivation ($\beta = .63$, p = .001) and metacognition ($\beta = .27$), while perceived value was also found to significantly and positively predict intrinsic motivation $(\beta = .40, p = .001)$ and metacognition $(\beta .32, p = .001)$. However, due to the effect of indirect relationships in the proposed model, a bootstrap analysis was performed to accurately assess the effect of indirect relationships and the stability of parameter estimates. The analysis showed χ^2 (68 = 471) 175.867, p=.001. Although χ^2 was statistically significant, it was somewhat negative to the estimation of a goodness of the model, since the Chi-Square is very sensitive to the sample size, especially when the sample size is more than 200. Thus, other indices were used to determine the appropriateness of the model. Hence, the assessment of other indices such as GFI (.95), AGFI (.92), IFI (.96), and CFI (.970), RMSEA (.043) $\chi 2/df$ (2.14 < 5.0) suggest that the model fits. According to Bentler (1990), a comparative fit index greater than .95 and a Root Mean square Error of Approximation (RMSEA) equal to or less than .05 would show a good model. Therefore, the bootstrapping analysis made the structural model more parsimonious and significantly improved the goodness-of-fit indices. Interestingly, the findings also indicate that 37% and 29% of the total variances of intrinsic motivation were explained by goal orientation and perceived value, while intrinsic motivation and metacognitive strategy accounted for 67% and 42% of variances in the students' academic performance.

All the hypothesized paths in the model which appeared in the figure were positively and statistically significant. Some errors involving intercorrelations of manifests assessing the latent constructs of academic intrinsic motivation, and the performance and avoidance manifest, were allowed to be freely correlated. This change was performed following an examination of AMOS generated modification indices. Thus, these intercorrelations were methodologically allowed, and theoretically justified and did not alter the associations among the latent constructs. According to this analysis, students' goal orientation was strongly predictive of intrinsic motivations and metacognitive strategy $\beta = .72$, p = .001 and $\beta = .46$, p = .001, which consequently affected students' academic performance. According to the model, as students' mastery and performance goal orientations inclined, their intrinsic motivation and use of effective meta-cognitive strategy would increase. Furthermore, perceived value was also found to be positively and statistically predictive of intrinsic motivations $\beta = .41$, p = .001 and metacognitive strategy β = .38, p = .01. These findings suggest that when learners value their learning based on instant, long term benefits and strong religious inclination, it would trigger and spark their intrinsic motivation and push them to use an effective metacognitive strategy. The analysis also indicated a direct relationship between goal orientation (r = 27, p = .001) and perceived value (r = .19, p = .001) on one hand, and students' academic performance on the other.

The analysis suggests that goal orientation and perceived value accounted for .37% and 29% of the total variances in learners'

academic performance. The result is not .35. Interestingly, the analysis also indicates that intrinsic motivation and metacognitive strategy are predictive of academic performance $\beta = .63$, p = .001; β .37, p = .001. Moreover, the findings also suggest the existence of a reciprocal relationship between intrinsic motivation and metacognitive strategy where each affects the other. According to the results of this analysis, intrinsic motivation is positively and statistically related to metacognitive strategy ($\beta = .26$, p = .001) while metacognitive strategy affects intrinsic motivation ($\beta = .22$, p = .001) in response. According to Hair et al., (1998), in the Structural Equation Model, a standardized regression weight is interpreted like Beta in multiple regressions with a maximum value of 1.0. The coefficient near to zero has no significant effect whereas an increase in value indicates an increased importance in the causal relationship.



BOOTSTRAP ANALYSIS

Bootstrap analysis was used to test the stability and generalizability of the proposed model. Bootstrap analysis is a non-parametric resampling technique aimed to empirically generate an approximation of the sampling distribution by allocating a standard error to determine the appropriateness and stability of the model. In this study, the bootstrap analysis was used instead of other available techniques such as the product-of-coefficients methodology (Sobel, 1986) or even Baron and Kenny's (1986) technique. This was due to its robustness to avoid biasness of non-normal data distribution and its ability to simultaneously increase statistical power, while at the same time control the Type One error rate (Cheung & Lau, 2008). It is also useful for providing point estimate and percentile bootstrap confidence intervals (CI) for total and indirect effects.

Hence, in this study, the researchers created a B=500 data set from the original data set and thoroughly investigated the measurement fit associated with them. This technique allowed the researchers to empirically calculate derived standard errors for all model parameters. The result of upper confidence intervals 'CI' for the parameters involved ranged from 0.79 to 1.036 and the lower CI ranged from .34 to .89, suggesting that the null hypothesis (the parameters' factor loadings equal to zero) for factor loadings for all parameters was rejected. This finding was also supported by the p-values of the parameters which were statistically significant (p < p.05). Interestingly, a 95% CI indicates that none of the regression CI included was 1.00, all the variances had high magnitude values, the CI did not contain a 0.00 value and the R² CI did not include 1.00, which statistically suggests that the model achieved a high degree of stability. The bootstrap analysis on the model shows evidence of a good-fit and remarkable stability across 500 iterations. Although the standardized coefficient values were somewhat similar before and after performing the bootstrap analysis, analysis of the model using a bootstrap of 500 iterations positively affected the model since the goodness-of-fit indices drastically improved and standard errors decreased across the parameters estimated which suggests the stability of the model and its generalizability. In addition to this, the mean result gained from the bootstrap analysis indicates close estimations to the original estimate and generally supports the major findings. The analysis suggests that the model has achieved stability across the baseline and bootstrap analyses.

Table 4

Parameter			Original estimate	Bootstrap		Bootstrap 95% CI	
				Estimate	SE	Lower	Upper
Intrinsic Motivation	<-	Goal orientation	.69	.72	.02	.61	.96
Metacognition	<-	Goal	.46	.46	.07	.77	.98
Intrinsic Motivation	<-	Perceived Value	.40	.41	.06	.89	.91
Metacognition	<-	Perceived Value	.36	.38	.07	.46	.90
Academic performance	<-	Intrinsic Motivation	.61	.63	.08	.70	1.12
Academic performance	<-	Metacognition	.36	.37	.05	.58	1.36
Mastery	<-	Goal	.60	.60	.05	.47	.79
Performance	<-	Goal	.54	.54	.06	.34	1.06
Avoidance	<-	Goal	.27	.29	.05	.44	.88
Utility	<-	Perceived Value	.40	.41	.05	.47	.83
Instrumentality	<-	Perceived Value	.27	.27	.04	.81	.93
Religiosity	<-	Perceived Value	.19	.19	.00	.51	1.01
Know	<-	Intrinsic Motivation	.50	.51	.24	.59	.89
Accomplish	<-	Intrinsic Motivation	.43	.43	.33	.63	.85
Stimulate	<-	Intrinsic Motivation	.31	.31	.34	.47	.81
Academic performance	<-	Goal	.35	.35	28	.56	.93
Academic performance	<-	Value	.29	.29	.18	.53	.96
Metacognition	<-	Intrinsic Motivation	.25	.26	.06	.61	1.36
Intrinsic Moti- vation	<-	Metacognition	.22	.22	.08	.57	.97

Bootstrap Estimates of the Indirect Effects, Standard Errors, and 95% bias Corrected Confidence Bounds

DISCUSSION

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The main objective of this study was to investigate the causal relationships between antecedents of intrinsic motivation and metacognitive strategy and their roles in students' academic performance. More precisely, the study has established causal relationships between goal orientation and perceived value in arousing students' intrinsic motivation and the usage of metacognitive strategy and consequently, how these affected students' academic performance in the Fundamental Knowledge for Matriculation (FKM) courses.

By using the Structural Equation Model, the study found substantial relationships and links between the constructs involving goal orientation, perceived value, intrinsic motivation, metacognitive strategy and academic performance. More precisely, direct and indirect relationships were found between goal orientation and perceived value on one hand, and students' academic performance on the other. According to the findings, goal orientation and perceived value were a significant predicator of academic performance. Moreover, both goal orientation and perceived value made significant contributions to intrinsic motivation and metacognition. Additionally, the findings also suggest the existence of a reciprocal causal relationship between intrinsic motivation and metacognition; both intrinsic motivation and metacognition substantially affect students' academic performance. These findings are supported by many previous studies that have established the relationships between intrinsic motivation and metacognition with students' academic performance.

Many empirical studies assert that goal orientation and perceived value affect academic performance (Huang, 2011; Husman, McCann, & Crowson, 2000; Miller, Behrens & Greene, 1993; Pintrich, 1999; Poondej, Koul, & Sujivorakul, 2013; Richardson, Abraham, & Bond, 2012). However, the magnitudes of their relationship vary across the studies conducted. Many studies suggest that intrinsic motivation enhances creativity and innovation (Fidan & Ozturk, 2015), deep learning processing, resilience and enjoyment (Prat-Sala & Redford, 2010), academic achievement (Taylor et al., 2014), performance and

intellectual ability (Gottfried, 1990; 1985). Llovd and Barenblatt (1984) assert that academic intrinsic motivation accounted for 19% of the total variance of the variables in their study. According to their study, the magnitude of intrinsic motivation in the academic setting was even higher than intelligence (IQ). As was found in the current study, intrinsic motivation and metacognition played significant intermediate roles between goal orientation, perceived value and academic performance. Similarly, Throndsen (2011) also found in his longitudinal study that metacognitive strategy positively correlated with students' mathematics performance. On the other hand, there are a wealth of empirical findings that identify a strong relationship between metacognition and students' academic performance. Specifically, these studies (Nik Suriana Nik Yusuf, 2001; Printrich & DeGroot, 1990) assert that the magnitude of a student's intrinsic motivation on academic tasks influences selection on an appropriate metacognitive strategy to solve academic problems.

More importantly, this study has also shown that there exists a reciprocal correlation between intrinsic motivation and metacognition. In this instance, intrinsic motivation and metacognition were found to interact in a more mutually influential fashion, in which the intrinsic motivation influenced the quality of metacognition while the metacognition simultaneously affected the quality of intrinsic motivation. This means that when a learning activity is able to arouse students' interest, both cognitive and metacognitive strategies will be used, mental resources will be maximally utilized, and information processing and imagination would be expanded and operated. Consistent with these findings is a study by Pintrich and DeGroot (1990) who discovered the existence of a reciprocal relationship between intrinsic motivation and metacognition.

CONCLUSION AND IMPLICATION

This research has found that goal orientation and perceived value are antecedents of intrinsic motivation and metacognitive strategy, which subsequently play an enormous role in students' academic achievements. These findings are found to be consistent with many previous empirical studies which have documented the significant role that intrinsic motivation and metacognitive strategies play in learning and performance (DePasque & Tricomi, 2015; Gottfried, 1990; 1985; Jovanovic & Matejevic, 2014; Negovan, Sterian, & Colesniuc, 2015; Ryan & Deci 2000a; Taylor et al., 2014). However, more importantly, this study has also identified that before an intrinsic motivation can be triggered within the learners or for metacognitive strategy to be meaningfully adopted and used, the learners should set goal orientations (mastery and performance) that are endurable and everlasting, and also learning that is suitable as well as clearly perceived. This will allow them to determine whether their efforts will be compensated by significant and long lasting benefits.

Hence within this view, goal orientation and perceived value are not merely supplementary factors, but rather, they should be regarded as fundamental requirements and main conditions for achieving teaching and learning success. Moreover, the study has also shown that religion is a significant determinant in Muslim academic endeavours. Thus, religion can be used as a stimulator to boost Muslim students' motivation and metacognition. Both intrinsic motivation and metacognitive strategy can enrich their learning activities and performance. Furthermore, the study indicates that raising students' goal orientation and perceived value awareness would not only spark students' intrinsic motivation and metacognitive strategy but also increase their engagement, creativity, innovation, resilience and academic performance.

These findings can be used to identify the key issues required to uplift students' knowledge, and can be regarded as a documented guide for both students and instructors on how to boost student's academic performance through intrinsic motivation, metacognitive strategy and their antecedents. In other words, students' poor academic performance can be overcome by enhancing their intrinsic motivation and metacognition by helping them to set endurable goals that facilitate learning acquisition and enhance their perception that constructive and meaningful involvement in academic activities would yield fruitful benefits in the future. The findings also imply that stakeholders must play an essential role in encouraging learners to not only set appropriate, achievable yet challenging goals, but also to endure any kind of difficulties they may encounter during their learning endeavours. They can do so by adopting the metacognitive strategy identified in the findings in an effort to boost their performance.

LIMITATIONS AND FUTURE RESEARCH

A major limitation of the current study is that the samples obtained were from Matriculation students at the International Islamic University Malaysia with the respondents comprising of Malay Muslims. It would be more meaningful for future research to focus on cross-cultural and multi-religious settings where the respondents would be drawn from other ethnic groups and religions in Malaysia or beyond, such as other Asian countries or even other continents. In doing so, the effects of intrinsic motivation, metacognition and their antecedents would be thoroughly examined across different cultures and religions. It would be useful to do so because what is found to be true for Muslims or Malay students might be different from other groups or religions. Indeed, even if the results are found to be replicated across other ethnicities and religions, the magnitudes and directions might be different.

Another limitation of this study is that the the data was only collected through a self-reported measure. Future studies should adopt other measurement approaches such as an experimental approach or a longitudinal study. In addition to this, other sources of self-report data should be collected, such as from parents, instructors and peers. This will provide future research with different perspectives and holistically assess students' learning activities.

Finally, future studies may also identify other key features such as causal relationships among the complex constructs that were not evident in the findings of this study. Thus, it is strongly recommended that an experimental design or a longitudinal approach or a mixed method approach could be used to gain more knowledge on how optimal learning occurs.

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