INFLUENCE OF METACOGNITIVE THINKING SKILLS ON SOLVING SOCIAL PROBLEM AMONG GIFTED STUDENTS IN SAUDI ARABIA

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Abstract

In this study, we examined the influence of metacognitive thinking skills on problem solving related to social problems among gifted students in Saudi Arabia. Metacognitive thinking skills as identified from the literature include declarative knowledge, procedural knowledge, conditional knowledge, planning, information management strategies, comprehension monitoring, debugging strategies and evaluation. Their influence on problem solving related to social problems among gifted students in Saudi Arabia was tested. Data was collected from two gifted learning centers in Jeddah province Saudi Arabia, the study respondents consist of 480 gifted students from the two selected province of Jeddah. The study revealed that metacognitive thinking skills significantly influence solving social problems among gifted students. The results of the current study demonstrated significant influence of metacognitive thinking skills for problem solving related to social problems among Saudi Arabian gifted students at different level of study, sub-groups and with respect to gender. The suggestion and recommendations based on the study findings would benefit the gifted student's centers, educational ministry, international and non-governmental organizations in the effort to improve the study learning conditions of gifted students in Saudi Arabia

Introduction

Metacognition is the ability of a child to comprehend and control his thinking and learning activities (Baker & Brown, 1984). While Flavell et al., (1993) also stated that metacognition refer to as activity of learning that controls any stage of cognitive process. Metacognitive thinking skills are the basic techniques used by the leaners to pereived and monitor the entire learning process. Metacognitive thinking skills and problem solving for social problem are going hand in hand especially in the domain of learning where students are faced with different problems on daily basis. Dresel and Haugwitz (2006), stated that the abilities of metacognitive skills indicate the capacities which the learner monitors his/her performance ad uses the different strategies to learn and remember. The learner develops and improves the use of abilities with the passage of time and practice for solving educational problems (Esteki & Moinmehr, 2012).

According to Huitt (1992), solving problem is a systematic process in which the solution seeker perceives and resolves a gap between a current situation and a desired goal which normally hindered some unknown complexities. In general solving problem is a mental process that can be executed by a person seeking for an answer, thus it involved specific steps to reach to the target goal and it requires the use of specific strategies as well (Downing, Kwong, Chan, Lam, & Downing, 2009).

Metacognitive thinking skills with different levels have a great importance in the learning field and teaching where students get opportunities for learning. That increases the confidence in their ability and gets the opportunity to use the skills for improving their experiences and learning to transfer to others. As well as students change their position at work and improve their ability to adapt accordingly, they regulate their behaviour and acquire awareness which is related to the growth of the strategy through conducive environment they live in (Ku & Ho, 2010). This study aims to investigate the influence of metacognitive thinking skills on problem solving related to social problems among gifted students in Saudi Arabia.

The Study Background

Metacognitive thinking skills refer to the basic abilities to understand, comprehend, explore, and evaluate an appropriate consideration upon which decision is based (Facione, 1990). Developing metacognitive thinking skills in broadly considered as one of the key determinant of achieving educational goal (Kettler, 2014). Thinking skills are among the uppermost list of skills needed for the 21st century (Trilling & Fadel, 2009; Walser, 2008). Also, in the field of gifted education thinking skills are considered as a contributing factor towards accomplishing special programs for the gifted students (Parks, 2009; Struck & Little, 2011).

Problem related to social are often termed as ill-structured, unlike classroom problems they are characterized as emergent as well with volatile answers that needs several assessment to serves as solution (Jonassen, 2000). The complexity of solving problem related to social problems warrants the application of metacognitive thinking skills in providing solutions because they cannot rely only on domain-specific knowledge, but rather on deep

investigation of the problem and possibility of providing flexible solutions (Land, 2014) Although researchers have established that, problem solving related to social problems are complex in nature but several study concludes that metacognition is called for when proving solution (Hong, Jonassen, and McGee, 2003).

Yet research investigating the role of metacognitive skills in solving social problem is still limited, especially among children of school age and little is known about gifted students (Aura et. al., 2011). Based on the available existing literature, prior studies on understanding and application of metacognition mostly focused on classroom system (Schraw and amp; dennison, 1994; Sperling, Howard, Miller, murphy, 2002).

The gifted students care centers established by Saudi Arabian government, which offer educational, psychology and social care to gifted students. The administration of this center comprises the Center Director, Teachers, and Assistants, behavioral specialists, academic and knowledge specialist, reseach laboratory attendants and general technicians. At the moment there are 31 care centre for boys and 20 for girls (Ministry of Education Saudi Arabia, 2016).

Despite the fact that several studies were conducted in relation gifted students issues in Saudi Arabia, but literature explaining the ability of gifted students on problem solving related to social problems using metacognitive thinking skills is lacking. In that regards, this study aims to investigate the influence of metacognitive thinking skills on problem solving related to social problems among gifted students in Saudi Arabia

Literature Review

According to Davis and Rimm (1989), gifted students are those students who possess the highest level of intelligence. They are distinct in terms of talent and complexity (Van Tassel-Baska, 2008). These necessitate the need for gifted students to be given full attention and care so that the society can benefits from their talents, capabilities, and proficiencies to a great extent. They further stressed that institutions should also play their active and vigilant roles in imparting education and professional skills to gifted students. Alamer (2014) also maintained the society could only benefit from the distinguished personal qualities gifted student if a special learning atmosphere is provided in terms of skilled teachers and a sound curriculum planning and implementation. Metacognitive thinking skills are the necessary skills that allow students to learn and practice them. The students need encouragement and reinforcement from others to practice this thinking through educational activities that are designed carefully (Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007; Schneider, 2008; Sriraman, 2003).

Metacognitive Thinking Skills

Metacognitive thinking skills are the techniques used by students to understand academic learning processes. It is a systematic process to 'think' about their 'thinking' (Eilers & Pinkley, 2006). Metacognitive strategies are used after using cognitive strategies that boost up their rate of learning, progress and academic achievement (Buettner, & Langfeldt, 2008).

1. Declaration Knowledge
2. Procedural Knowledge
3. Conditional
4. Planning
5. Information Management Strategies
6. Comprehension Monitoring
7. Debugging Strategies

Declarative knowledge

According to Bruning (1994), declarative knowledge is the information and real knowledge which an individual is acquainted with. In other words, declarative knowledge is known as the factual information stored in memory and is considered to be stagnant or static in nature. It is also known as propositional knowledge and/or descriptive knowledge.

Procedural knowledge

Procedural knowledge is the ability of knowing how to respond or perform certain activities. This type of knowledge is making us cognizant and conscious about events and actions. Besides, it can sometimes be verbalized. It is a kind of knowledge about linguistic form and metalinguistic knowledge (Bruning, 1994). With reference to the current study, declarative knowledge refers to the gifted students' ability to employ learning metacognitive thinking or strategies such as how to answer a question or how to respond in certain situations.

Conditional knowledge

Kern-Isberner and Eichhorn (2014), stated that conditional knowledge means to know about why and when to use declarative and procedural knowledge. It assists students to assign their attributes and resources when to use a specific strategy for a specific task. In other words, it helps students on how to respond and react effectively and strategically. In connection with the present study, conditional knowledge relates the gifted students' knowledge

about how to use a particular strategy or reason and why does it prefer to use this strategy in a particular learning situation.

Planning

Metacognitive thinking includes three main skills such as planning, monitoring and assessing. According to Baker and Brown (1984), planning refers to the students' understanding and knowledge of the strategies that are used to accomplish the task and consciousness regarding how to use them in some certain circumstances. It includes planning the skills, specify the objectives, follow-up skills and knowledge of the sequence of errors and obstacles

Information management strategies

Information management is one of the elements of organizational activity which involves gathering of information, keeping, and dissemination or making it available to those who needs it. In an organization, stakeholders been responsible for handling information they might the right to instigate, modify, disseminate or delete information defending on the policies of the organization (Dabbagh & Kitsantas, 2012).

Comprehension monitoring strategies

Comprehension monitoring refers to cognizant steps of sensing a problem by good readers. It helps readers to become focused and in control of their own reading comprehension (Boekaerts & Corno, 2005).

Debugging strategies

These are series of activities or process used in controlling cognitive actions and to ensure the aim of metacognition is achieved. Debugging strategies has several other benefits which include correcting conception and performance error, control and monitor learning, planning observing, and examining outcome of metacognition (Brown, 1987; Efklides, 2008).

Research Methodology

The questionnaire survey instruments used in collecting the data for the study was adopted from Schraw and Dennison (1994), which comprises 52 items under two major constructs.

Data Collection

In this study a mixed research design method was used, that is a combination of both quantitative and qualitative research method were adopted in an attempt to achieve the research objectives (Johnson, 2006). There are two gifted students' centres in each of the 42 districts in the kingdom of Saudi Arabia, in total making 48 gifted students' centres with one centres for both male and female respectively in each district as required by the Saudi Arabian legislations. According to the Department of Education in the province of Jeddah, the number of male and female gifted students in the academic year 2013-2014 was 5210 as shown in table 1 below.

Table 1: Detail about gifted students in the province of Jeddah

Class	Level	Males	Females	Total
Intermediate	1	648	411	1059
	2	510	359	869
	3	474	373	847
Secondary	1	443	409	852
	2	487	341	828
	3	423	332	755
Total		2985	2225	5210

Simple random sampling technique was used in selecting the study sample, in total 480 gifted students were randomly selected from the two gifted student's centres in Jeddah province Saudi Arabia. For the interview, a total of 12 gifted students were randomly selected from the two gifted centres to generate the qualitative data using the structured interview protocols in order to triangulate the result. Therefore, two major instruments used in collecting data for the current study are: the questionnaire survey instruments adopted from Schraw and Dennison (1994), which comprises 52 items under two major constructs; and the interview protocols developed by the researcher based on the items constructed in the questionnaire.

Data Analysis

In order to analyse the influence of metacognitive thinking skills on problem solving related to social problems, the following assumptions were tested based on ordinal regression.

      *I. **Assumption 1, dependent variable must be non-parametric ordinal results:** Positive problem orientation **is non-parametric variable. This assumption is accepted.***

II. ***Assumption 2, independent variables must be continuous, ordinal or categorical:*** *Information management and comprehension monitoring are continuous factors. This assumption is accepted.*

III. ***Assumption 3, no multicollinearity:*** *this is checked using collinearity diagnostics and the VIF results must be less than 2 and will be ideal when be close to 1. The current results are 1.001 for both independent variables.*

These assumptions are accepted for comprehension monitoring and information management. The final statistical model of positive problem orientation showed that information management and comprehension monitoring are the significant predictors of positive problem orientation, however the value of odd ratio were low and this is attributed to the small sample size. For the type of relationship, positive problem orientation is significantly increased with high information management, while decreased with high comprehension management, as shown in Table 2

Table 2: Predictors of positive problem orientation

	Estimate	SE	OR	95% CI		
				Lower	*Upper*	*p* value
Information management	**0.049**	**0.020**	**1.051**	**1.010**	**1.093**	**0.015**
Comprehension Monitoring	**-0.060**	**0.025**	**0.941**	**0.896**	**0.989**	**0.016**

Ordinal regression (logit): chi-square = 12.113, df= 3, *p* value = 0.007. Cox and Snell =0.024, Nagelkerke = 0.025

For interaction of predictors, no significant impact for the interaction of information management and comprehension monitoring on the positive problem orientation, as shown in table 3

Table 3: Predictors interaction impact to positive problem orientation

	Estimate	SE	OR	95% CI		
				Lower	*Upper*	*p* value
Information management	-0.040	0.170	0.961	0.688	1.340	0.814
Comprehension Monitoring	-0.188	0.243	0.829	0.514	1.335	0.440
Information management* Comprehension Monitoring	0.003	0.007	1.003	0.991	1.016	0.598

Ordinal regression (logit): chi-square = 12.113, df= 3, *p* value = 0.007. Cox and Snell =0.025, Nagelkerke = 0.025

Discussion of Findings

The study revealed that metacognitive thinking skills significantly influence solving social problems. Based on the result, the study believes that each category of the social problem can be developed independently and separately from the other. Metacognitive thinking skills refer to the leaner's ability to perceive and monitor his/her learning processes. It is considered beyond knowledge processes because the cognitive skills are used to perform a task while processing knowledge which is necessary to understand how to accomplish the processes (Boekaerts & Corno, 2005). On the other hand, problem-solving related to the social problem is achieved by applying suitable skills analytically to ascertain the real problem (Landry et al., 2006). Among gifted students, social problem solving helps to develop hypotheses and test predictions to arrive at desirable solutions (Frye, 1997). Metacognition influences self-evaluation that helps the gifted learners to steer away from passive knowledge (Heng, 1994). Metacognition thinking skills and processes are applied to monitoring the performance of students as well as evaluating ideas and decisions during and after the problem-solving process Hofer (2004). These findings emphasise the significant correlation between metacognition and problem solving, and the findings were consistent with Schoenfeld (1992) and Mevarech and Kramarski (1997) whose outcomes confirmed that students with a higher level of metacognitive thinking skills become more successful in problem-solving.

Summary and Conclusion

The study investigated metacognitive thinking skills to solve social problems among gifted students in Saudi Arabia. The result exposed the influences of metacognitive thinking ability of gifted students towards solving social problems, which is a timely finding for the Saudi Arabian educational sector. Theoretically, the study established a concrete connection and mutual relationships between metacognitive thinking skills and problem-solving related to social problems among gifted students in Saudi Arabia through the theory of mind (TOM) of David Premack (1978). According to Papaleontiou-Louca, (2008), the theory of mind explains the ability of human beings to think, clarify, understand, and explain behaviour based on mental being which includes sensing, understanding, thinking, wanting, believing, seeing, forecasting among others.

Recommendation

Developing a framework that will establish the influence of metacognition towards solving social problems among gifted students in Saudi Arabia is necessary to improve the learning conditions of the gifted learners. It is highly recommended that the Saudi Ministry of Education should enhance facilities that will help the gifted student improve their level of metacognition. Also, a more realistic expectation should be directed towards gifted students with regard to their individual differences. Teachers must promote their students' metacognitive skills to solve social problems

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