

How Metacognition Supports Giftedness in Leadership: A Review of Contemporary Literature

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Abstract—The purpose of this article is to investigate how metacognition supports giftedness in leadership. In this paper, we provide a literature review of the contemporary literature. The concepts of metacognition, giftedness, and leadership seem to be interrelated. The article attempts to explore new trends in understanding giftedness and its development. Research has shown that the concept of metacognition is inextricably linked to the concept of giftedness. Metacognition has an important role in the development of individuals because it helps them to improve their cognitive and metacognitive skills. Metacognitive skills, such as monitoring, self-regulation, and awareness, are higher skills that gifted individuals process to a high degree and, through training, can improve even further. Moreover, the metacognitive skills of monitoring and adaptation can affect leadership skills. The metacognitive skills that are associated with leadership are self-awareness, regulation, and monitoring.

Keywords—metacognition, giftedness, leadership, 21st century skills, metacognitive skills

1 Introduction

Understanding the concept of metacognition is important for understanding the development of the concept of giftedness. Metacognition is the knowledge of cognition, as well as its monitoring, adaptation, and regulation. The cognitive skills of the human brain that contribute to the organization of knowledge do not remain unchanged in space and time; on the contrary, they are constantly changing as the individual evolves, acquires experience, and gains knowledge. The cognitive function consists of a wide range of functions and skills. There is no doubt that certain aspects of cognitive skills are quite general and related to effective performance in a wide range of not only academic skills, but also non-academic qualifications [1]. To put it in another way, cognitive skills do not constitute a specific knowledge but mainly have to do with the way we learn, solve problems, process information, remember, and focus.

The human brain functions as a system where there is complete interdependence between its various parts. Human consciousness is made up of layers, and in this way, human knowledge acquires entirety and cohesion. People perceive the outside world through the senses and external awareness, while the world of thoughts, feelings, and daydreams are perceived with the help of awareness, which includes self-knowledge

and is a fundamental metacognitive ability. According to Koch (2018), the majority of the researchers accept consciousness and try to understand its relationship with the objective world [2]. The state of consciousness changes over time; it is different in childhood from that in early adulthood [3]. Through the literature review, we will try to investigate how metacognition can support giftedness in leadership.

2 Material and methods

The purpose of the research was to investigate how metacognition supports giftedness in leadership. Through the literature review, we tried to investigate if metacognition can support giftedness in leadership and if metacognition can lead to higher levels of leadership in gifted people. We found many reports and articles. The literature on metacognition, giftedness, and leadership is very broad. We tried to focus on the relationship that exists between these three concepts. We found the latest research and articles published in international journals through search engines such as ResearchGate and Google Scholar. The search terms used were metacognition, metacognitive strategies, giftedness, leadership, and 21st century skills.

3 Results

3.1 The 21st century skills

In recent years, there has been a lot of talk about the skills that students should have in order to cope with the challenges required today. The skills of the 21st century are the keys to practicing a job. An employee, in order to succeed in the current working conditions, must have a set of key skills. The acquisition of 21st century skills has become even more important than knowledge in specific subjects. These 21st century skills include not only the acquisition of knowledge and skills, but also the knowledge of cognitive processes and the understanding of knowledge. Therefore, it is a combination of complex skills and knowledge [38].

The skills of the 21st century include critical thinking, problem solving, collaboration skills, flexibility and adaptability, creation and innovation, communication skills, building skills, technology skills, social awareness, career orientation, self-management skills, and leadership skills [39, 40]. According to the Organization for Economic Cooperation and Development (OECD), there are three categories of 21st century skills: (a) skills related to the use of interactive tools, (b) collaboration skills in groups with inhomogeneous individuals, and (c) self-efficiency skills [41].

Today, people are called upon to solve complex problems in their daily and professional lives [42]. In the 21st century, all citizens, if they want to be competitive in the job market but also in their daily context, will have to acquire these skills. Therefore, educational systems must prepare students with sufficient knowledge and skills that they are capable of applying in the future [43].

There is a great need to acquire the skills of the 21st century because they are necessary for the employment of citizens. One of the skills of the 21st century is human resource

(HR) development. HR development refers to the process of acquiring the necessary knowledge and skills from employees, in order to contribute to the achievement of the company's goals. According to Nadler & Nadler (1986), HR development refers to organized learning activities, which provide the opportunity to improve job performance and the personal development of employees [44]. The concept of development refers to the expansion of the potential of individuals through conscious, but also unconscious learning processes. According to Wilson (2005), development closely combines learning with work experience [45]. Moreover, according to Garavan (1997), it refers to wider personal development and change, thus expressing a timelessness [46]. The acquisition of upgraded knowledge and skills is the value for both employees and the organization. The HR development is related to career flexibility skills, and it is directly related to leadership.

3.2 Metacognition

Introduction to metacognition. John Flavell (1979) is one of the most important theorists in the field of conceptual metacognition, whose work dates back about 40 years and is considered the prototype on which theories related to metacognition were based and developed [4]. According to Flavell, metacognition is related to the issues: (a) cognitive knowledge, (b) cognitive experiences, (c) goals or tasks, and (d) actions or strategies. Metacognitive knowledge consists of knowledge and beliefs that interact and can affect the course and results of our cognitive enterprise.

Graham & Schraw (1997) distinguish metacognition in metacognitive knowledge: what someone knows about their cognitive function, and metacognitive control [5]. For example, this would include how someone can use their knowledge to regulate their cognitive functions. Metacognitive knowledge is distinguished in: (a) declarative knowledge, which is the knowledge of their skills and the ability of the individual to learn; (b) procedural knowledge, which is the knowledge of how a learning process is applied; (c) compulsory knowledge, which is the knowledge of when and for what specific learning process knowledge can be used. On the other hand, metacognitive control consists of: (a) design, planning, and implementation of objective; (b) control (i.e., the monitoring and evolution of learning and strategies); and (c) evaluation, which is the analysis of effectiveness of what was implemented. In addition, they argue that metacognitive knowledge and metacognitive control appear to develop earlier to gifted students compared with this development in non-gifted students [5].

Many researchers converge on the view that metacognition consists of two components: knowledge about the cognitive function and monitoring of knowledge [4, 6]. According to other definitions, metacognitive is the ability of individuals to know their cognitive functions, to control them as they operate, and to regulate them, in order to achieve the best adaptation to their needs and requirements. According to Cross & Paris (1988), metacognition is the knowledge and the control that children have over their own thinking and learning activities. To be more specific, cognition is the awareness and conscious manipulation of thoughts, skills, and learning processes [7]. In addition, according to Kuhn & Dean (2004), it is the awareness and management of their own thoughts [8]. According to Martinez (2006), it is the monitoring and the control of thoughts [9].

In order for individuals to develop their cognition, they must develop strategies and acquire skills of observation and adaptation of their cognitive processes through mental self-observation of their cognitive skills. In this way, individuals can successfully complete the construction of the knowledge pyramid. Individuals must successfully complete each level so that they can move to the next level each time. For each level of the knowledge pyramid, there are specific and defined skills that children must acquire, along with completely different metacognitive skills [10].

More specifically, at the base of the pyramid are the stimuli that are introduced encoded, as neural representations in cognitive processing system of individuals [11]. The next stage is the data, which individuals perceive through their senses. Data and information vary from person to person because everyone perceives differently, as it depends on each person's cognitive patterns, the information they already possess, their beliefs, their experiences, and their values [12].

At the level of knowledge, individuals organize information, theories, and axioms. The human brain has the ability to transform information into knowledge, which is enriched by each person's experiences, views, beliefs, perceptions, and values [13]. Specialization is a very specific knowledge in a specific field of human knowledge. Individuals are able to distinguish between different stimuli they receive [14]. Moreover, they are able to create new solutions, knowledge, and beliefs in their field of knowledge.

According to Maslow (1965), self-realization can be achieved only when individuals have met all their other basic needs and have the desire to fulfill all their abilities. It is self-knowledge and self-awareness [15]. According to Rogers (1974), self-realization is the force for the improvement of individuals [16]. Furthermore, individuals unify theories, ideas, concepts, behavior, needs, and problems that may arise and use problem solving [17]. According to Maslow (1969), transcendence is the feeling of absorption and concentration [18].

Metacognitive strategies. Metacognition is, without a doubt, the basis for higher-order thoughts. Having thoroughly analyzed how knowledge works, we can now analyze in more detail the learning strategies that help to this direction. Many researchers have dealt with and analyzed metacognitive learning strategies thoroughly. Below are some of the metacognitive learning strategies used in studies, and their results were positive in promoting effective learning.

Ku & Ho (2010) examined the role of metacognitive learning strategies in critical thinking [19]. Ten students participated, from the University of Hong Kong, after being divided into two groups: one of higher performance and one of lower. Three metacognitive strategies were examined: planning, which is the preparation of execution of the plan; monitoring, which is the understanding of tasks; and evaluation of thoughts and actions based on performance and in relation to the result. The results of the research prove the great importance of metacognitive strategies in critical thinking. Significant differences were found in the two groups, which arose because the higher-order groups performed better overall than the other groups, as they were able to plan better steps, to review them, and to identify design errors more easily.

Kim et al. (2010) investigated the effects of metacognitive learning strategies on game-based academic achievement [20]. For the purposes of the study, they used a commercial game MMORPG, known to the general public as Gersang. The study involved 132 participants, who played the game for 45 minutes each day. The following three strategies were developed for this research: self-regarding is a strategy

according to which students record their thoughts, modeling is a process of self-monitoring through the observation of others, and think aloud is a process in which students say aloud the strategies they follow. The results showed that the most effective metacognitive strategy was thinking aloud, followed by modeling and, finally, self-recording.

Baas et al. (2015) conducted research to investigate the relationship between learning assessment and elementary school students' cognitive and metacognitive strategies [21]. The sample of the research included 528 primary students, aged 9 to 12, from seven primary schools in the Netherlands. The metacognitive learning strategies were: (1) monitoring involves activities that help students understand what they know, (2) scaffolding is an activity in which students choose a strategy to execute and will help them to achieve their goal more effectively, (3) task orientation is an activity that takes place before students start their work, (4) planning is the activity of prioritizing goals, (5) surface learning strategies involve the activity of students reading, again and again, what they have to do until they fully understand it, (6) deep-level learning is an activity in which students know well what to do and are able to relate it to previous knowledge, (7) product evolution is the evolution after finishing their work, and (8) process evolution is an activity in which students generally evaluate the process and wonder whether they will use the same or similar strategies next time or choose a different one. The results of the study demonstrate the direct relationship between learning assessment and cognitive and metacognitive strategies.

Berger & Karabenick (2016) designed a study to test the validity of the self-report as a metacognitive learning strategy [22]. There, 306 ninth-grade students participated, who attended the mathematics class of a USA High School. The metacognitive strategies examined were: (1) planning, which are activities related to what one needs to learn it, how much time is needed, which the best way is, and what the goal set is; (2) monitoring, which refers to activities that take place either during the educational process or at the end and are related to whether the goal was achieved through the process of self-control, and (3) regulation, which is a process that depends on the results of the educational process.

Wagaba et al. (2016) designed a study to evaluate the effectiveness of the intervention, with the aim of enhancing metacognitive learning strategies in Secondary school students [23]. The study included a plan before and after. Two questionnaires were used to evaluate metacognitive strategies: Metacognitive Support Questionnaire and Metacognitive Strategies Questionnaire. The metacognitive strategies studied were: (1) Self-Regulation, which includes planning, monitoring, and evaluation; (2) Cognitive Strategies, which include strategies such as classification, casual analysis, hypothesis formulation, generalization, and inference, and (3) Cognitive Self-consciousness, which concerns the monitoring of one's thoughts. The research involved 35 students. The results showed significant benefits in students' attitudes and perceptions of intervening in metacognitive strategies, which proves that the majority of the students consider metacognitive strategies to be very important.

In conclusion, although each researcher adopts and analyzes different metacognitive learning strategies each time, we perceive that all these concepts and strategies complement each other, many times overlapping each other, while coexisting under the same prism [24]. Therefore, according to a holistic view, cognition, metacognitive learning strategies, and finally consciousness are a single whole.

Drigas & Mitsea (2020) suggest a mindfulness model based on mechanism of metacognition [25]. They adopt a holistic view, according to which they present the

8 pillars of metacognition. The 8 pillars are: (1) academic and theoretical knowledge of the cognitive function and cognitive skills, (2) functional knowledge about functioning of cognitive abilities and cognitive limitations, (3) self-monitoring, (4) self-regulation, (5) adaptation, (6) recognition, (7) discrimination, and (8) Mnemosyne. Moreover, according to them, metacognition and mindfulness are identical and interrelated concepts, because mindfulness training improves metacognitive skills and metacognitive skills improves mindfulness, leading to consciousness.

3.3 Leadership

Gifted students are commonly believed to have high leadership potential. Leadership is considered by many scholars as an aspect of giftedness, as gifted students display leadership behaviors in their adult lives. Leadership is a multidimensional concept and, therefore, difficult to define by one definition. Some of the characteristics of gifted students are related to leadership. They are interested in social issues, they show sensitivity and understanding in complex problems, and they have advanced social responsibility [48]. A collection of comparative studies demonstrates the relationship of gifted students, as well as the ambition of gifted students to take leadership positions [50, 51]. According to Sternberg (2005), the gifted leader consists of the composition of three elements: creativity, intelligence, and wisdom. The gifted leader has excellent creative skills, academic knowledge, practical ideas, and wisdom-based skills that have the impetus to serve the common good [47]. According to Gardner et al. (2005), awareness and self-regulation are characteristics of an effective leader, which are directly related to the concept of metacognition [49].

Muammar (2015) investigated leadership skills in gifted and non-gifted students and the relationship between intelligence and leadership protentional. In total, 176 college students participated in the research. Using the Leadership Inventory, data were collected about problem-solving skills, effective communication, and planning skills. The results showed that gifted students had higher means for planning skills than non-gifted students [53]. Lee et al. (2020) developed a survey about gifted students' perceptions about leadership and leadership development. In total, 440 gifted and 303 non-gifted students of secondary age participated in the research, and they were asked about their perceptions of capable leaders, aspirations to become leaders, and expectations regarding leadership development. The results showed that gifted students consider leadership skills an important aspect of leadership. Gifted compared to non-gifted students are more motivated to take on leadership roles on social issues using conflict-resolution skills [52].

Moreover, the metacognitive skills of monitoring and adaptation can affect leadership skills. The metacognitive skills that are associated with leadership are self-awareness, regulation, monitoring, understanding, and influencing others [54]. According to Gardner et al. (2005), self-awareness is fundamental to leadership development [55].

3.4 The relationship between metacognition and giftedness

Metacognition and giftedness have been shown to be closely linked. Cognition is considered important to be able to better understand giftedness, because gifted students seem to have enhanced cognitive ability from a very early age. In fact, according to

Benito (2000), gifted students from early childhood begin to use effective metacognitive strategies to solve problems, and they are able to identify and articulate which strategies they followed [26].

In addition, Barfurth et al. (2009) believe that cognition is important for understanding giftedness, because understanding and educating gifted children and adolescents can later lead to highly capable adults [27]. The greater the understanding of these children's cognitive processes, the greater the awareness of how they should be educated and trained. Synder et. al. (2011) explored the differences in cognition between gifted and typical students. All students assessed their metacognitive skills through a self-test questionnaire. Sixty-seven students from a public school in the United States participated in the research. To qualify as gifted, students must meet specific criteria, according to the Raven Scale, which measures general thinking ability. The Cognitive Awareness Scale was also used to measure the skill of metacognitive awareness through the process of self-control. The results showed that the gifted students surpass the standard students, having superior cognitive abilities throughout the research and significant qualitative differences in cognition compared to the typical students [28].

A metacognitive ability is the monitoring thinking that helps the individual to monitor their actions, in order to optimize their strategies and achieve the desired results. It is a skill related to self-regulatory skills—a skill that evolves and can be improved through training and practice. Gifted individuals are able to monitor their thoughts and actions and develop strategies differently from other children.

According to Tortop (2015), self-regulatory skills are those skills that help the individual to control and monitor their thoughts, behaviors, and actions and adapt them to the requirements of circumstances. Self-regulation skills seem to be higher in gifted students than in non-gifted ones. The aim of the research, conducted in Turkey, was to compare the self-control skills of gifted and non-gifted students in the Science course. The participants were 264 students from two schools in a province of Turkey of medium socio-economic level. The sampling method was used to determine the sample. Gifted students were those who had a score above 130 on the WISC-R Test. The tools used were the Self-Regulation Scale for science course, which was developed to determine students' self-regulation skills. The results of the research showed significant differences between self-regulatory skills of gifted and non-gifted students, as self-regulatory skills were higher in the gifted students [29].

Vogelar et al. (2017) investigated the role that cognitive flexibility and cognition plays in students' progress, as well as the benefits that derive from their education and training in these areas. A total of 113 children aged 7–8 years old participated in the research. They were given the Raven Scale to determine their mental ability and were divided into groups: typical children (n=68) and gifted children (n=45). The results showed that gifted students outperformed their peers in Raven scores and cognitive transformations with more advanced metacognitive skills. Moreover, the gifted students made more progress and seemed to start from a higher starting point, which they maintained throughout their educational process [30].

Self-regulation is a complex process, which includes skills that ensure the achievement of a learning objective is related to cognitive skills and motivation. Self-regulation learning is particularly important for the development of gifted students' cognitive skills, which can be both discovered by the students themselves and taught through the learning of specific strategies. Learning control strategies is important

because some gifted students, even though they have a good mental capacity, find it difficult to further develop their skills and their academic achievements, which are not always in line. In addition, some gifted students have stress- and time-management problems that affect their learning. Interventions related to metacognitive management skills can help gifted students in that direction [31].

It is important that the learning is oriented towards a specific goal, so that the learner can decide if their goal has been achieved. To achieve this, they must combine the knowledge they acquire from external environment with the knowledge they possess and which is in their long-term memory. Then, through the assembly process, they combine the elements and the information they have. Finally, they can transfer this information to other formats. The goal is always the adaptation. In self-regulation learning, learners adapt to the prevailing conditions to continue the course of learning, perform the appropriate actions, and finally evaluate the results of their actions [32].

Giftedness can be perceived if we consider that it consists of academic success, achievements in practical intelligence, and skills related to wisdom. Metacognitive processes are very important, as they are at the top of the hierarchy of knowledge for quality of life and social progress, because their existence marks a successful person. In addition, metacognition is closely linked to the handling of knowledge, emotions, and skills in a balanced way. Thus, individuals will be able to be successful in all areas, such as personal, social, and mental areas [33].

It seems that the metacognitive awareness of gifted individuals is higher than that of non-gifted individuals. This is because gifted individuals seem to have better cognitive bases, which can more effectively support metacognitive skills. In a study to examine the metacognitive awareness of gifted individuals in relation to stress in mathematics, the results showed that the higher the metacognitive awareness of gifted individuals, the lower the stress in mathematics compared to non-gifted individuals [34].

4 Summary and discussion

Education ought to aim at developing the skills of the 21st century skills in order to promote capable students and, later, capable adults. The 21st century skills are considered necessary for the future citizens and are important for HR development because they can help individuals to have more career opportunities [25]. Through the literature review, we found that the concepts of metacognition, giftedness, and leadership are interrelated, as shown in Figure 1. Metacognition has an important role in the development of individuals. Metacognitive skills such as monitoring, self-regulation, and awareness are higher skills that gifted individuals process to a high degree. Moreover, the metacognitive skills of monitoring and adaptation can affect leadership skills. The metacognitive skills that are associated with leadership are self-awareness, regulation, and monitoring.

From the literature review, we conclude that metacognition can support giftedness in leadership. Gifted people are often singled out for their leadership and take on exceptional leadership roles [35]. Therefore, leadership development should be an integral part of gifted education [36]. According to Marland's definition (1972), gifted individuals are capable of high academic skills, creativity, and leadership capacity [37].

The development of metacognitive skills that we specifically define as monitoring, regulation, and adaptation can be said in one word as consciousness [10]. Gifted individuals have increased cognitive skills from an early age compared to typical individuals. The cognitive and metacognitive skills that a person possesses represent the state of executive functions of memory, attention, self-knowledge, awareness, self-regulation, and—in general—consciousness. We conclude that metacognition can support giftedness in leadership. Finally, if leadership is based on consciousness and giftedness, then we will have high leadership skills.

5 Conclusion

The scope of this study was to present how metacognition can support giftedness in leadership. From the findings of this study, we analyzed that metacognition could help gifted people to take leadership roles. Metacognition and giftedness have been shown to be closely linked. Through metacognitive strategies, gifted people gain better adaptation and regulation in corporate environments. When leadership is based on conscious self-regulation and giftedness, then we can have a high level of leadership in corporate environments. We therefore conclude that the concept of leadership is closely linked to the concept of metacognition and giftedness. These three concepts are interrelated, and one is a component to the other, as shown in Figure 1. Finally, we consider that the field of metacognition and giftedness in leadership needs more research.



Fig. 1. The relationships between metacognition, leadership, and giftedness

6 References

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