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Reflective thinking in school: a systematic review

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ABSTRACT

Everything around us changes rapidly and to adapt to these constantly changing conditions and to understand the meaning of our life in the society in which we live, we must reflectively and consciously think about our actions in each given scenario. A school is a miniature form of society where learners are exposed to situations where they need to find solutions for every problem faced. No faultless solution and conclusions can be arrived at without a carefully employed reflective thinking process. In this context, the present study reviewed 19 intervention studies on reflective thinking in schools published between 2010 and 2021 and presents a brief summary. Various theories on reflective thinking, approach of educationists on reflective thinking of students and the relation between reflective thinking and students' academic performance, are extensively analyzed. The findings of the study reveal that there are a few generally accepted theories of reflective thinking; reflection is a useful learning strategy and reflective thinking is an essential characteristic of academic excellence. This study recommends future research with a wider scope to accommodate more theoretical perspectives and wide-ranging databases.

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1. INTRODUCTION

It is generally perceived that reflection is a mindful and dynamic process of attentive and organized thinking which is different from floating thoughts. During the process of reflection, the practitioner selects relevant and spontaneously produced thoughts [1]. In recent years, evidence of a commonly accepted concept of reflection in the areas of education and learning is found among researchers. Reflection on learning is indispensable as students need to revisit the gained knowledge for in depth learning [2], [3]. There are studies which validate the relevance of reflective practices in the educational process. Mezirow [4] theory on reflection says that reflection is a rational practice, and rational beings make decisions by reflecting upon the process and result of the choice made [5]. People reflect while an action is being done and after the act is completed, but do not consciously use any tool in reflection [6].

Reflective thinking is characterized by an analytical consideration of an experience in relation to another experience or prior knowledge [7]. It covers four stages, i.e., habitual action, understanding, reflection and critical reflection [8]. Students who do not think reflectively while learning, fail to critically assess a situation and thus may not progress in their academics, while the students who engage in reflection on their actions, can evaluate their actions and can make further improvements [9]. Students' recollection of experience could be enhanced through reflective activities [10]. One of the foremost aims of education and the primary goal of pragmatism is to produce reflective thinkers. Reflective thinking enhances the impact of the experience.

Further, the reflective practitioner evaluates the performance and has knowledge of the progress made which will be beneficial for future experiences [11].

Reflective thinking assists students to evaluate their learning process by recognizing their strengths and shortcomings. Studies have proven the interrelatedness of students' reflective thinking and their academic performance. There are many views on different processes and levels of reflection in learning [12]. Empirical researches conducted in various school settings indicate the positive effects of reflective thinking of students of their metacognitive skills, emotional intelligence, listening and comprehension, self-monitoring and critical thinking [13], [14].

Despite the existence of previous studies conducted on the significance and educational importance of reflective thinking, there is scanty evidence of systematic reviews exclusively on empirical studies on reflective thinking in school settings. In addition, research on reflective thinking is dispersed across many areas such as education, psychology, nursing, and technology sociology, making common understanding of the terminology "reflective thinking" in schools a challenge [15]. Identifying this gap in the literature, we designed a systematic review to assess the current empirical studies on reflective thinking of students and its influential effects on their academic performance. To establish the maximum focus of the review, based on three main questions, we considered only empirical studies conducted in schools from the year 2010 to the year 2021. The results and recommendations of this study can eventually become an outline and guide for educational administrators in implementing programs to enhance reflective thinking in schools.

2. RESEARCH METHOD

2.1. Identifying keywords and search strategies

We conducted a comprehensive and systematic search on the scholarly electronic databases, such as PubMed (n=427), Science Direct (n=198), Psych Info (n=405), and Google Scholar (n=623) from July 15, 2022 to August 4, 2022. In order to narrow, broaden and combine literature search terms, Boolean connectors were used on search terms such as "Reflection", "Thinking", "School", "Students", "Empirical" or their equivalent. To avoid inappropriate data overweighing the relevant data explicitly meant for this review, we defined the search string narrowly. The search terms were restricted to the title or abstract, however, restrictions were used on the year of publication and language. Based on each database's exact search requirement, the search strategy was modified and filters were applied to obtain wide-ranging and content-centric literature.

2.2. Selecting studies and inclusion and exclusion criteria

Systematic reviews deliberately aim to find answers to definite questions, rather than provide overall summaries of the studies on a topic of interest [16]. In the initial search in the databases, we identified 1,653 article records. Later, the titles of the articles were screened to identify the relevant literature for the current systematic review. While scanning the abstract, if the literature was found relevant, we downloaded the full text of the article. Permission was sought for relevant articles to which we had no direct access. Subsequent to the elimination of duplicates of the literature and determining the relevance of the remaining literature to the current review, a total of 1,329 articles were screened. Literature that did not fulfil the inclusion criteria was excluded from the study, resulting in 19 articles being included in this systematic review. The inclusion and exclusion criteria are given in Table 1. The progression of literature search and study selection is represented in preferred reporting items for systematic review and meta-analysis (PRISMA) [17] in Figure 1.

Table 1. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Studies conducted between 2010-2021	Opinions, grey literature, reviews and editorials
Intervention population of school students	Working papers, theses, white papers
Full paper accessibility	Unpublished works, non-English publications
	Non-intervention studies
Studies published in English	Experiments conducted at college and university levels of education
Studies published in peer-reviewed journals	
Experimental studies	

2.3. Data extraction

In the data extraction stage, we performed data assortment independently, however, when differences arose on eligibility assessments, a compromise was arrived upon. After eliminating the duplicates and inaccessible literature, we scanned the titles and abstracts based on the prefixed inclusion and exclusion criteria. The eligibility of each literature was ensured by reading the entire article. The data extracted is presented as a simple descriptive assessment of each piece of literature. The table includes the details of the participants in

the study, the interventions, results and three basic research questions: i) what are the general theories on reflective thinking?; ii) what is the approach of educationists towards reflective thinking; and iii) what is the relationship between reflective thinking and the academic performance of students? We also extracted relevant particulars of the study participants; their number and eligibility, intervention used, location of the study, year, design, and the method.

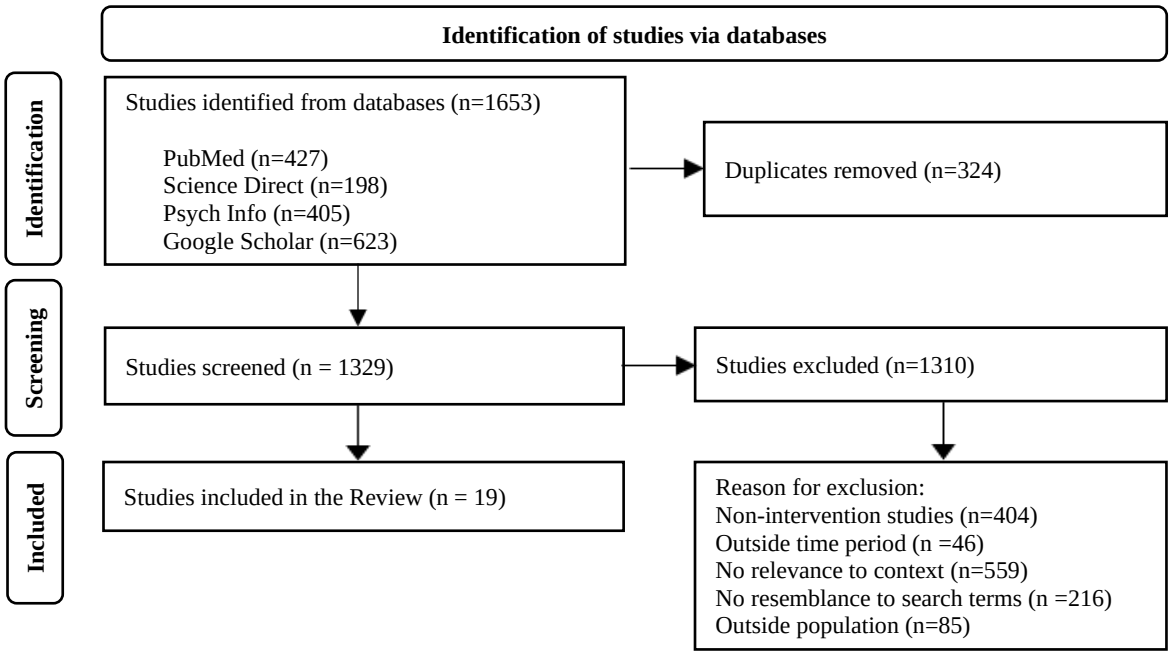

Figure 1. PRISMA flow diagram of article selection

2.4. Data synthesis

Data synthesis is the primary characteristic of the systematic review [18], [19]. After data extraction, the relevant data associated with the predetermined research questions of the study need to be synthesized with a critical appraisal [16]. Consistent with the research questions, the data from the tables was pooled, descriptively synthesized and generalizations were made.

3. RESULTS

The result of this review is arranged to summarize the selected studies which dealt with the relevant questions pertaining to reflective thinking in educational contexts. Various studies addressed a couple or more questions under consideration. A summary of the results is given in Table 2 [20]–[38], while other findings are presented under the three relevant questions.

3.1. What are the general theories on reflective thinking?

There were 12 studies were identified that addressed this question. These studies vastly discussed the concept of reflective thinking in a learning context. Concerning this question, although our purpose was to search different theories on reflective thinking, we found that most of the existing theories are nothing more than an extended interpretation of the reflection theory of Dewey [7], however, a few other theories are also reported. Reflective thinking is a process through which an individual makes an assessment of the situation and draws plans to comprehend it and evaluate the situation under the established plans [20], [25], [28]. During the progression of reflective thinking, an individual evaluates and interprets the felt experience, makes sense of it and solves the given problem by justifying the action [21]. It is a type of thinking which allows an individual to asses if the steps are taken in the right direction towards problem-solving. Additionally, reflective thinking comprises skills for identifying mistakes and logical connections, critiquing and drawing conclusions [23]. Thinking reflectively allows an individual to be fair-minded and evaluate situations and experiences from a different standpoint [28], [38].

Table 2. Summary of the included studies

Location and study	Design and data collection	Study population and sample size	Brief findings of the study
Iraq [20]	Experimental and quantitative	4th grade students; n=62	Adey & Shayer model of teaching mathematics has more impact on achievement of students than traditional method of teaching.
Palestine [21]	Experimental and quantitative	Female students of secondary school; n=87	Students' general and particular reflective thinking can be enhanced by training teachers in constructivism models of teaching.
UAE [22]	Quasi-experimental and quantitative	Students of 10th grade; n=94	In the age of digital curricula, cloud-based educational program improves the reflective thinking skills of students
Jordan [23]	Quasi-experimental and quantitative	Students of 7th grade; n=60	Enhanced reflective thinking on scientific concepts is evidenced when discrepancy and round-house strategies were implemented.
Turkey [24]	Quasi-experimental and quantitative	Students of 7th grade; n=60	When students were involved in Fe Te MM (Science and Technology, Engineering and Mathematics) activities, their ability to solve the problem through reflective thinking improved.
Turkey [25]	Quasi-experimental and quantitative	Students of 7th grade; n=70	Structured activities in the classroom help develop the critical thinking of students in mathematical curriculum
Turkey [26]	Quasi experiment and quantitative	Students of 6th grade; n=40	Increased academic performance was evidenced when STEM disciplines were integrated into Toulmin's argumentation activities.
Turkey [27]	Explanatory sequential design, mixed method	Students of 7th grade; n=41	Integrating STEM and ABI approach enhances students' scientific creativity, academic success and reflective thinking skill for problem-solving.
Egypt [28]	Quasi experimental qualitative design	Prep School students; n=62	Digital stories have influencing consequences on students' writing performance but do not affect Reflective Thinking
Turkey [29]	Quasi-experimental and qualitative	students of 10th grade; n=66	Cooperative learning is more effective in developing students' reflective thinking than the traditional method of teaching
Indonesia [30]	Experimental and mixed method	Students of 8th grade; n=56	Problem-based learning and guided enquiry learning methods have more effects on students' reflective thinking skills in mathematics than conventional learning.
Indonesia [31]	Quasi-experimental and quantitative	Students of 8th grade; n=140	Knowledge sharing strategy positively influences students' reflective thinking skill in learning mathematics.
Indonesia [32]	Experimental and quantitative	Students of 7th grade; n=30	Applying reflective thinking approach enhances students' ability to learn mathematics.
Turkey [33]	Quasi-experimental and quantitative	Students of 6th grade; n=66	Integrating STEM education with constructive teaching does not have much effect on students' reflective thinking skills to problem-solving.
Indonesia [34]	Quasi-experimental and quantitative	Students of 8th grade; n=166	Students' learning motivation and mathematical reflective thinking skill increased when FSLC learning model was applied.
No mention of location [35]	Quasi-experimental and mixed method	Dutch students; n=72	Students' and teachers' active involvement in the process of feedback can be stimulated by feedback dialogues.
Indonesia [36]	Quasi-experimental and quantitative	Students (grade not mentioned); n=56	When Search, Solve, Create and Share model is applied, mathematic problem-solving skill of students increases
Turkey [37]	Quasi-experimental and quantitative	Students of 5th grade; n=110	When SCRATCH method is applied students tend to involve in problem solving more positively and engage in reflective thinking.
Indonesia [38]	Quasi-experimental and quantitative	Students of 8th grade; n=60	Mathematical reflective thinking skills of students can vastly be influenced by probing- prompting model of learning.

Reflective thinking is an emotional and intellectual activity of discovering new meanings and experiences based on the assessment of the given situation. In school context, reflection becomes indispensable to learning mathematics [29], [30]. From a cognitive point of view, it is a mental process aimed at understanding the reasons for conflict in a situation. This mental process which is a response to a situation facilitates thinking backwards as one is stimulated to reflect on the past action [32]. Reflective thinking involves a serious and careful contemplation of a real experience in connection to another situation or to the preceding knowledge. In the context of learning, it is willful thinking wherein students become cognizant of their learning [35], [39]. From a critical perspective, reflective thinking is a powerful learning experience as it supports comprehension of the content; transfer of knowledge and designing one's learning process based on experience [37], [40].

3.2. What is the approach of educationists towards reflective thinking?

A total of eleven studies directly or indirectly addressed the attitude of educationists towards reflective thinking. Educationists affirm that when students recognize and reflect on scientific concepts; and adopt new strategies to make meaningful learning experiences, they exhibit better academic performance [23]. A learner involves in reflective thinking when facing a situation or problem that needs an appropriate solution. Teaching models integrated with reflective thinking practices will enable learners to develop their strategies of reflection and face hypothetical situations and solve any problem independently [20]. Previous studies [21], [33] revealed that reflective thinking promotes a meaningful learning process that aids students to become more critical in their approach; developing proficiency in their specific areas of learning and making reflective decisions.

Reflective practices become indispensable in learning mathematics as it requires facilitating an interrelation between strategy selection, concepts and reflection [25], [41].

The practice of reflection is imperative in science education as it reveals learning habits and develops critical thinking and problem-solving strategies. Such reflective practices enrich students' mental perspectives as they make efforts to find varied solutions for the problems encountered [27]. Reflection in a classroom is vital to all kinds of learning as it enables learners to relate new learning to previous experiences. It makes students' thinking more observable and provides a platform for them to gain insights into others' perspectives. In addition, in an age of technology where students tend to become mechanical consumers of information and fail to make a judgement of their reliability, reflective thinking has a significant role in student evaluation [28]. Thinking reflectively is crucial to learning as it assists learners to make a critical retrospection and develop an attainment strategy for problem-solving. Awareness on improving one's ability to learn and a sense of responsibility for one's learning, can be attained when students engage in reflection [29], [42].

Students' reflective practices in learning mathematical concepts and logical thinking can be developed by scaffolding provided by the teacher [31]. When guided through the right reflective process, students feel relaxed and interested as they enjoy autonomy to express their knowledge; feel empowered to find solutions for their problems and approach mathematics learning with a positive outlook [32]. One study concluded that since mathematic reflective thinking has not become a learning objective, students exhibit low mathematic reflective practices [34]. Reflection helps students to perform complex tasks as it involves self-regulation and the selection of appropriate thinking activities [35]. The selection of accurate learning models can enhance the reflective thinking and problem-solving skills of students [36].

3.3. What is the relation between reflective thinking and the academic performance of students?

Studies related to the different phases of reflective thinking have found empirical shreds of evidence of its association with students' academic performance. Reflection and critical reflection constructs of reflective thinking have positive effects on academic performance [24], [43]. A pleasant classroom environment with positive and supportive feedback and specified objectives enhances students' reflective thinking and self-regulated activities such as organization, elaboration and critical thinking [44].

The test achievement model based on reflective thinking activities and tasks to answer rational and cognitive problems helps students accelerate their mental development and find many solutions for a single problem [20]. Through reflective practices, students acquire the skills of assessing their academic strengths and weaknesses; and critically look at their fundamental ideals, beliefs and assumptions on which their actions and feelings are based. Constructivism and reflective thinking allow students to be responsible for their learning, set objectives and participate in the learning process. When this is followed by a self-evaluation of their performance and a discussion academic progress can be achieved. Teachers play a vital role in designing reflective thinking experiences in the learning environments to ensure better academic performance of students [21], [33]. Better academic performance is ensured when students engage in reflective practice as it equips them with positive qualities such as originality, comprehension, creativity, innovation and curiosity. It reduces their impulsiveness and increases forethought [22].

Connecting new knowledge to prior knowledge through reflection, third-grade students showed better performance in the perception of scientific concepts through roundhouse and discrepancy strategies. In this context, knowledge is preserved in long-term memory; concepts are divided into portions, resulting in students' higher levels of thinking and improved academic performance [23]. Cooperative learning strategy and Journal writing practices increase students' reflective thinking skills and academic performance [25]. STEM-based argumentation method provides opportunities for indicating reflective thinking actions such as questioning, assessing, and reasoning [27]. In the story method of teaching, comparatively weaker academic performance was evidenced in a group of students who were not habituated to reflective thinking practices. In this context, lack of reflection on real-life situations made them less equipped with a reflective thinking process during the digital story method of teaching and learning [28].

Exposing students to organized reflective practices develops their reflective faculties whereby they assess their academic performance [26], [29]. Students whose reflective thinking skills are higher, tend to complete their learning activities independently in logical reasoning. Students who possess mathematical reflective thinking skills such as the ability to recognize conclusions, proof, vague language, assumptions and conflicts; and assess statistics reasoning, sampling and measurement, logical reasoning or articulate a value, can perform better in academics [31].

Improvement in the process of learning is mandatory as it directly leads to an improved quality of education. When reflective thinking is incorporated into teaching-learning process, students in general feel comfortable and show interest in learning. When the mathematical learning process in the classroom, in particular, is coupled with a reflective thinking process rather than being a knowledge-transferring process,

students can find solutions for the academic problems they face [32]. Search, solve, create, and share (SSCS) method which is structured into different stages can positively affect students' mathematical reflective thinking skills where they become more focused during group discussions [30], [36]. When students examine a given content or situation with a critical perspective reflective learning becomes a powerful experience [37].

4. DISCUSSION

Based on three questions we conducted this review to evaluate the existing experimental studies on the reflective thinking of students and its resultant influencing effectiveness on their academic performance. In this section, the present state of research in the previous context is discussed. In the reviewed studies researchers employed theory based-quantitative (n=6), qualitative (n=4) or mixed method (n=9) approaches. All studies proceeded after the careful formulation of concepts and theories and appropriate research questions. most studies (n=18) included control groups while one study [32] did not have control groups. The findings are briefly summarized; and the relationships and the assumptions for which research evidence is not yet established, are highlighted. implications for further research for educational practice are also recommended.

4.1. Reflective thinking theories

Our first focus was to identify various theories on reflective thinking across all the reviewed studies. While classifying the theoretical perspectives, we identified three major models of reflection. We found that most studies (n=10) referred explicitly or inexplicitly to Dewey's [7] theory of reflection wherein reflection takes place in 'Content, Process, and Reflection'. He defined reflection as "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends" [7]. Few other studies (n=5) had Mezirow theory [39] for a theoretical framework where reflection takes place at four levels, i.e., 'Habitual action, understanding, reflection and critical reflection.' Thinking activities are connected to cyclical methods of experiential learning which integrate activities in successive cognitive and affective phases [35]. Reflection as an action can be understood as many things; consciousness of an object; allowing one's thoughts to wander and consider alternatives. It always may not imply evaluating what one reflects upon.

Some studies (n=4) focused on the theory of Boud *et al.* [45] with four stages of reflection, i.e., association, integration, validation and approbation. They conceptualize reflection as "a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to a new understanding and appreciation." By this conceptualization, reflection comprises of making interpretations, analogies, generalizations, discriminations and appraisals. In this process, one unintentionally uses beliefs to form interpretations and generalizations [46]. In school contexts, reflection is also perceived as an intellectual activity of determining new meaning based on the valuation of the given situation where reflective practices become crucial in learning mathematics [29], [30]. From an intellectual point of view, reflective thinking facilitates understanding the causes of conflict in a particular situation. While responding to a situation, this mental process enables thinking backwards as an individual is moved to reflect on past experiences [32], [47].

4.2. Educationists' approach to reflective thinking of students

Learning may be perceived as the process of using previous knowledge to make a new or revised explanation of the meaning of one's knowledge to direct one's action [46]. It is observed in the reviewed studies that the terminology 'Reflective Thinking' is applied in several disciplines of learning such as technology (n=1), mathematics (n=5), cooperative learning (n=3), learning scientific concepts (n=2) and learning English language (n=2). Reflection appears to realize quite a few functions including enabling learners to make meaning of difficult situations and exhibit better academic performance [23]. For a learner, the process of reflective thinking becomes multi-factorial as it goes through different stages. When students are guided in the right reflective process, they enjoy autonomy to express their knowledge; find solutions for their problems and show the right approach to learning mathematics [32], [36].

Students do not tend to reflect in all situations; they reflect when stimulated by a certain pedagogy of teaching that includes activities for reflective practices. As students perceive situations and problems differently the degree of reflective thinking among students also varies. Students' reflective practices are directly associated with the strategies of learning; besides, the learning environment can play an encouraging and stimulating role in reflection. The role of the teachers and mentors also affects directly or indirectly the reflective practices of students as their role has a scaffolding effect on the students [31]. As a learning strategy, reflection is extremely useful as it assists learners to relate new knowledge to the existing one. Since knowledge can be gained by experience, reflection influences the affective domains of their learning.

The effects of reflective thinking may not be observable to students wherein the tactical role of the teachers becomes extremely important. Teachers' guidance and supervision are of vital importance to students' reflective practices and the resultant learning as they provide a route map to be followed. While students need

to be allowed to think reflectively at their own pace, the mentors need to ensure that students are enabled to have a collaborative and individual reflective experience [28]. Learners can measure their strength and weakness and accordingly condition their learning needs by reflective thinking which plays the role of a self-appraisal tool [29], [42]. Teachers need to support students constantly to seek evidence to validate and augment their self-appraisal. It increases their proficiency to make reflective decisions [25], [41].

A significant assumption suggests that the learning competence of students can be enhanced when reflective thinking is seen as a strategy or a habit of mind as it keeps one on track and helps to take a stock of what one is doing and why [25], [28], [48]. The quality of teaching and the relationship between teachers and students can be improved through reflective practices. It is possible through the development of novel programs and open communication with peers and students. From an educator's point of view, reflection is crucial to planning and implementing new strategies of learning [34], [40].

4.3. Reflective thinking and academic performance of students

The main objective of any pedagogy is to help students to perform better in academics and bring out desirable learning outcomes [49]. A variety of pedagogical strategies such as test achievement [20], roundhouse stagey [23], Fen (Science), Teknoloji (Technology), Mühendislik (Engineering), Matematik (Mathematics). FeTeMM [24], cooperative learning, [25], [34], digital stories [28], problem-based learning [30], and feedback dialogue [35] were identified. Researchers have shown considerable interest in the classroom as an effective precursor of good academic results. Empirical evidence of the relationship between reflective thinking and enhanced academic performance has been identified by researchers [41].

Students' mental development to solve problems could be accelerated through reflective practices [20]. Through reflective practices, when knowledge is preserved in long-term memory and retrieved when required better performance in academics can be attained. By assessing one's academic strengths and weaknesses through constructivism and reflection, one shows more responsibility for achieving one's academic goals. Further, constant self-appraisal through reflective practices can ensure that one's academic progress is achieved or not. The originality of thought, creativity and innovation coupled with curiosity; and accurate comprehension of the problem at hand can be a precursor of improved academic results. In a conducive classroom environment reflection enables students to reduce impulsiveness and increases prudence which eventually leads to a positive academic outcome. Being habituated in reflective practices in real life situations can augment reflection in the learning process. Students who do not engage in reflective practices in daily life do not have positive academic result [22].

When learning becomes mere gathering information and rote memorization students become incapacitated to transfer knowledge to real-life situations and are likely to act more on their fear and prejudices than sound judgement. Exposing students to apply logical reasoning to identify a problem and arriving at conclusions independently in learning is possible through reflective practice. In this context, teaching becomes a dynamic process where students' involvement is ensured and the process of mere transferring of knowledge is prevented. The capacity to evaluate and analyze a piece of information makes students competent in involving effectively in learning programs and be more dedicated and planned to their studies which results in a better academic outcome. It is evident from research findings that when mechanical habitual action is replaced by reflection and critical reflection students critically evaluate a given situation and make meaningful changes [48], [50]. When students make decisions by reflective thought rather than by thoughtless habitual action, they go through a process of questioning, weighing the evidence and interpreting the problems. This also facilitates them to question their personal assumptions as and when it becomes necessary.

4.4. Implications of the findings

The researchers identified the following implications of this present study in the context of educational practices. Reflective thinking helps learners to integrate new learning into the existing knowledge. Reflective practices also facilitate self-assessment as students involve in reflection-on-action. When students engage in habitual reflective practices, it enhances their academic competence. Educationists may take note of these implications and promote reflecting thinking among students by implementing appropriate educational strategies.

4.5. Limitations of the study

The researchers admit that this study has certain limitations. This review covered only English articles from specific sources. White papers, working papers, theses, unpublished works and studies published before the year 2010 were not included. Besides, interventional studies conducted in college education were not added. The conclusions of this review may have been affected due to the exclusion of the studies mentioned herein.

4.6. Recommendations

As this review had only 19 studies as samples, further research is recommended to include a larger sample size for more authenticity of results. For a more accurate conclusion, non-intervention studies, non-English publications and unpublished works also could be reviewed since this paper reviewed only intervention studies. The scope of future research should be broad and inclusive to accommodate more theoretical perspectives and a wide-ranging database.

5. CONCLUSION

Education is all about creating individuals who are more reflective of their own actions to have control over their life. This review has attempted to provide a summary of different perspectives about reflective thinking; approach of educationists towards it and its significant effects on academic outcome of students. The results of this review indicate that there is a plethora of ways in which reflective thinking is defined by researchers. The finding of this study points to the fact that reflection is a necessary quality for a learner as it is often regarded by educationists as an essential characteristic of academic excellence. There is uniformity of opinion among educators that reflection is a useful learning strategy. However, the educational strategies framed by educators should provide students with activities to engage in reflective practices within and without the classroom. Further research is suggested to assess the impact of such educational strategies to promote the inclusion of reflective thinking practices in teaching learning process.

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