

A Brief Literature Review of Concept Mapping for Reflective Practices

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Abstract: *Education has become society's demand for sustainable development, cooperation, and financial independence. Reflective teaching emerges as a philosophy that can increase professional skills and expertise. Concept Map is a visual tool that enhances understanding by structuring and expressing knowledge. Since knowledge representation is the core quality of both Concept Map and Reflective Practices, they may be linked. This article gives a brief literature review of Reflective Practices and tries to find out the relation of Concept Map with Reflective Practices.*

Keywords: reflection, concept mapping, concept map, conceptual understanding, teaching

INTRODUCTION

According to UNESCO documents, all universities attempt to improve their educational technologies and infrastructure to provide new organisational arrangements for creating, applying, and defining the teaching-learning process, assessment processes, and resources and their common integration in the current technological era. (Vodovozov & Raud, 2015). The primary goal is to develop an educational atmosphere where students are encouraged to study the skills directly relevant to their speciality and the different knowledge domains useful in the professional working field. Teachers can evaluate the appropriateness of learning objectives and technologies by knowing what students need to learn, and teachers may enhance instruction by understanding how students learn. Students in any discipline begin their study with an introductory course that introduces them to its essential concepts (Saavedra & Opfer, 2012).

Teachers often expect learners to find connections between the facts and concepts they learn in respective disciplines and the materials they study across other courses in their curriculum. Along with expectation, it is also the educator's responsibility to provide such an interactive environment in which learner can use their full potential to learn and find such connections which will facilitate their learning. Educators rely on new educational technologies to enable learners to access large amounts of study material in an innovative way that allows them to explore more to connect with others. Along with new technologies, educators also rely on traditional resources because they are pre-existing tools for new technologies. Concept Map is one of them that has been used extensively in the educational field in the past three decades.

Reform in pedagogical content knowledge and easy accessibility to knowledge are reasons for present educational reform. The taxonomy of pedagogical content knowledge defines various

components of pedagogical content knowledge, and it also characterises their relative importance, and reflection is among them. Now reflection is part of pedagogical content knowledge. Because of this fact, reflection is now incorporated at every level of educational planning and is a part of curriculum development (Vean; Makindter 1999). At every level of the curriculum, we must define reflection to maintain the quality of education.

In the field of education, the phrase "Reflective Practices" is not new. They are an essential component of the educational system. We will get into it more later, but there are a few terms to be aware of; Reflection, Reflective Practices, Reflective Teaching, Concept Maps, and Concept Mapping. Understanding these terms individually is vital to tell the link between Concept Mapping and Reflective Practices. However, some well-known scholars on Reflective Practice, such as Donald Schon, offer a far more in-depth and comprehensive explanation of Reflection and Reflective practices. However, it is essential to understand the fundamental concept behind Reflective Practices and Concept Mapping before going further. It will help us understand the relationship between Reflective Practices and Education, and we will be in a better position to answer some of the questions. One important thing to note is that we use two different terms, "Concept Map" and "Concept Mapping", while they convey the same meaning. We always start thinking by making a mental image before planning any policymaking. It is true either in any case, whether it is policymaking, business plan, teaching, or anything that involves cognitive processing. But in the educational context, we also make a lesson plan before teaching any fact, concept, theory, or lesson. Concept Map is a graphical tool or graphic organiser used for better conceptual understanding. There are many types of graphic organisers like Mind Map, Knowledge map, Venn diagram, T-chart, V chart, etc. These all are graphic organisers, but they are not the same and serve different purposes. Concept Map is used for concept acquisition, but it can also be used for Reflective practices (Novak & Cañas, 2006). There is a famous quote in India by Acharya Chanakya, a world-renowned diplomat and economist and a Sage, seeker, and ascetic of spiritual text. He said, "*The teacher is never ordinary; holocaust and creation grow in his lap*". Teaching as a profession is a very responsible job that creates all other occupations and is the future maker. Teaching is a reputed profession, but teachers' salary is limited to a certain level. It is much lower if we compare a teacher's salary with other professionals like engineers, doctors, accountants, managers, etcetera. All other professionals have to reflect at every level of their job, which leads to better performance and higher salaries.

Teachers in higher education have to Reflect-for their academic careers, leading to their promotion and other incentives. But this reflection in their profession is based either on the publications or academy development rather than their teaching. But the most important thing is that they all are teachers, and they should Reflect-on their teaching. And it should also need to be a part of their profession and account for their performance.

But when we talk about school education, there is a considerable disparity in the value of teacher education and a significant variation in teachers' wages. An increasing number of private schools and institutions provide a much superior education. But being an educator, we can often observe the absence of reflection in the educational area.

Giridhar (2019), in his book "*Ordinary people, extraordinary teachers: The heroes of real India*", describes the lives of more than a hundred educators working in rural schools in three

states Karnataka, Rajasthan, and Uttarakhand, where Azim Premji Foundation have a presence. Azim Premji Foundation is a well-known non-government organisation in India known for providing quality education in rural areas. Further, Giridhar describes the problems of rural government schoolteachers through specific case studies. He shows how teachers go beyond their limits to educate rural children so that they can reflect better in their life. This study tells that teacher education in well-known schools run by famous NGOs is not very good. Then we can imagine that the condition of state-run government schools is measurable, and they even lack basic infrastructure and facilities. Then the question arises, how will teachers Reflect-on their teaching? The condition of other developing countries is similar or even worse. In these situations, Concept Map comes as an inexpensive valuable solution to provide better understanding. So, it becomes essential to understand all aspects of Reflective teaching and its connection with Concept Maps.

Research Question

The word 'Reflection' is used extensively in all subject areas as it integrates every aspect of human life. So, it becomes challenging to study reflection. For this reason, we will try to limit our work within the educational context. For this, we can frame the following research questions:

1. What is the fundamental concept behind Reflective Practices and Concept Mapping?
2. What does the literature say about Reflective Practices and Concept Mapping?
3. How do Concept Mapping and Reflective Practices relate to each other?
4. How can Concept Maps be used for Reflective Teaching?

Since both the terms, Concept Mapping and Reflective Practices, are conceptual and descriptive in nature, it is necessary to conduct a systematic literature review to answer the above research questions. However, in the process of review, for some reason, the researcher decided to do a Narrative literature review instead of a systematic literature review, which we will discuss later in the methodology section.

REVIEW OF RELATED LITERATURE

This present article aims to present a brief narrative review of literature on Reflective Practices and Concept Mapping to find out the relation between Concept Mapping and Reflective Practices. One important thing to note is that we use two different terms, Concept Maps and Concept Mapping, but they convey the same meaning. Concept Map is a graphic organiser used for assimilating, associating, and constructing knowledge. In contrast, Concept Mapping refers to a process in which how Concept Map is used for assimilation, association, and construction of knowledge. So, throughout this article, the term "Concept Mapping" is analogous to "Concept Maps" and vice versa.

Concept Map

Concept Maps are visual representations of information based on Ausubel's theory of meaningful learning in the classroom (Ausubel et al., 1978). Examples include charts, graphic organisers, tables, flowcharts, Venn Diagrams, timelines, and T-charts. This tool has been used in research studies for depicting and evaluating knowledge for the past three decades. Despite this, Concept Maps are also used extensively for Reflective Practices. Concept Map is one of

the most powerful graphical tools for knowledge acquisition. Novak and Gowin (1984) developed a holistic rubric for grading concept maps. They presented three theoretical underpinnings for a holistic scoring rubric for assessing students' conceptual evolution of ideas using Concept Maps which are clarifying, expanding, and assimilating. Each of these areas is necessary for conceptual growth (Novak & Gowin, 1984).

Hyerle (1996) advocated using a "common visual language", such as Concept Map by pre-service teachers to develop reflective thinking. The application of Concept Maps in the teacher education class by the university teachers will provide a standard tool that enables all pre-service teachers to follow the same format while discussing instructional design and planning. When used consistently, an adaptable deeper level of understanding is achieved by introducing, applying, and reinforcing thought patterns. Over time, a network of interconnected thinking processes could emerge.

Reflective Teaching

Reflective teaching is the application of Reflective Practices in a teaching-learning environment. Teachers need to observe what is going on in their classroom and how they are doing. Reflective Practices include the term 'Reflection,' or specifically 'Critical Reflection'. Before we go into details of Reflective Teaching, we will need to discuss what Reflection is and how it can improve educators' skills to promote teachers' accountability towards their profession and benefit their students. On the one hand, Reflective Teaching ensures teachers' accountability; on the other hand, it provides a novel way to assess the whole teaching-learning process.

What is Reflection?

Reflection is an activity or process that involves recalling, considering, and evaluating an experience, usually in a broader context. It is a reaction to a previously occurring event that is critically examined. But when we talk about reflection in educational settings, it has many aspects. In the Educational system, we need to define reflection in both the processes, i.e., teaching and learning. But the important thing is that these two processes are not independent and rely on each other. So, if we talk about reflection in the teaching process, it will affect learning as well, and as soon as learning is affected, it will also affect teaching. Because the reflection of learning is nothing more than the result of teaching that occurred in an educational setting, it will affect the teaching. Learning reflection merely serves as feedback for teachers and will aid in the quality of instruction.

In scientific terms, Reflection shows what an individual, an event, or a process is in a broader perspective. But the researcher thinks it is challenging to present it without any personal bias, subjectivity, context, or intentions as they are always trying to cover up the reality. So, to get a clear view, we need to critically analyse the term 'Reflection', which is why the 'Critical Reflection' term is used. The term 'Reflective Enquiry' refers to the process of gathering as much information about an event as possible, intending to learn everything there is to know about it. Reflective teaching is a more applied and standard term that rationally analyses the whole teaching-learning process. Using these terms in all aspects of the teaching-learning process will give life to Reflective teaching.

Reflective teaching is a personal tool that teachers use in the classroom to observe and evaluate their students' behaviour. One will delve into the underlying principles and beliefs that guide one's work. It can be a private or shared process with co-workers. When someone gathers and analyses data about what happened in the classroom, one can learn more than just what worked and what did not.

Teachers who have this level of self-awareness have a powerful ally, especially when what they teach and how they teach might change instantly. Reflective teaching is an inquiry-based approach to learning that emphasises a caring ethic, a constructivist teaching methodology, and problem-solving creativity (Henderson, 2001). Reflective practice in teacher education aids teachers in making the transition from routine to more planned activities in their classrooms. This type of change claims to make teachers "better," or at the very least, more conscious of their pedagogical methods and attitudes (Vallance, 2006). As an essential and compelling record of teaching practicum, Reflective Practice is now incorporated into teacher education programmes worldwide (Farrell, 1995; Murphy, 2003).

Schön (1983) defines Reflection-in-action as "reflecting on the incident while it is still beneficial to that situation rather than reflecting on how you would do the things differently in the future". According to him, this is a useful tool in all disciplines. The professional must react to an event when it occurs rather than thinking about what happened and making changes later. Schön defines this process as "when someone reflects-in-action, he becomes a researcher in the practice context. He does not rely on established theory and technique but instead develops a new theory of the unique case. Surprising incidents occur when people use knowing-in-action (knowledge gained in other/similar situations) in a new situation that is inappropriate for the current (unique) situation." To overcome this, rather than applying preconceived notions about what should be done in a specific situation, the person reflecting decides what works best at that time for that particular event/incident.

Constructivism, metacognition, and pedagogical reasoning are among the theoretical underpinnings of Reflective Practices. Pre-service teachers must understand the learning process to help them build the necessary knowledge for successful instructional planning (Veal & MaKinster, 1999). Reflecting on one's work and improving practices based on this reflection is essential for becoming an effective teacher (Blackwell & Pepper 2008).

According to Moore (2003), field activities have a higher potential for providing pre-service teachers with an opportunity to practise instructional decision-making and reflective practice. When designing classes, pre-service teachers focus on classroom settings to make suitable pedagogical instructional decisions, and these choices are crucial for effective instructional design and delivery. The ability of pre-service teachers to reflect will be critical when they enter the teaching profession.

Ghaye (2011), in his book *Teaching and Learning Through Reflective Practices*, defines six key ideas of Reflective Practices:

1. Reflective Practices help us understand the connection between what we do and how we can improve to make it more effective
2. Reflective Practices provide links between feeling, thinking, and doing.
3. Reflection is 'structured' or organised thinking.

4. We can understand our practices just by looking backwards.
5. It is essential to use the power of paternity of reflection
6. Many things can trigger reflection

Larrivee (2008) defines four levels of reflection:

1. Pre-Reflection Level
2. Surface Reflection
3. Pedagogical Reflection and
4. Critical Reflection

Critical reflection is most important in the learning context as it rationally analyses the whole teaching-learning process and provides feedback to create various learning opportunities. In day-to-day classroom settings, knowing 'what' and 'why' helps to get common information which helps in decision making while preparing the curriculum. The usual questions 'What' and 'Why' give an insight into any event that allows collecting as much information for critical analysis of these events or processes. But if one talk about reflection and how does it take place, it is essential to mention these three stages:

1. Pre observation
2. The observation
3. Post observation

During the above three stages, each participant will observe and will be observed. The term "Reflection" is used in various contexts, which leads to a lot of ambiguity. To clarify this ambiguity, we must investigate the terms Reflection, Reflective Enquiry, Critical Reflection, and Reflective Teaching. Some of these terms are used in isolation, whereas others are used in conjunction with others. The pure form encapsulates what reflection is. There are four common views of reflection defined as:

1. Reflection-In-Action
2. Reflection-On-Practice
3. Reflection-For-Action
4. Reflection-With-Action

The first two ideas of reflection, which are 'Reflection-In-Action' and 'Reflection-On-Practice', are given by Donald Schön (1983). In his book "*The Reflective Practitioner*", Donald Schön introduced concepts such as Reflection-On-Action and Reflection-In-Action, which show how professionals overcome their work problems through improvisation that improves with practice.

Reflection-In-Action

It has two meanings, first can be referred to as reflection in a particular context like a workplace. For example, in a classroom, in a factory, an office, a hospital ward, a home, we always see the reflection in a particular context. For example, in a school, only teaching-learning behaviour is the main focus to be observed. That is why the classroom is the best place to assess teaching and learning skills that always show reflection in the context of teaching and

learning. The same goes for an office, a hospital ward, a home, or a factory, as they always assess skills in their respective context. It means assessment goes along with the procedure itself simultaneously (Schön, 1983). It also means thinking about what you are doing while actually doing it.

We can also use Concept Maps as Reflection-in-action. Before going to the classroom teacher gathers what information students already have and then prepares a concept map on the selected topics. When they teach in the classroom with the help of Concept Map, they observe both what was planned and what is going on simultaneously. Concept Maps always help teachers to abide by some specific objectives. In this scenario, the teacher assesses himself based on indirect feedback that they get from their learners. Reflection-in-action is an immediate evaluation of an event. Here assessment is done in the field of action and thus provides an opportunity to improve instruction in real-time.

Reflection-On-Practice

It also has two meanings. First, it can be reflection after an interval or after the end of an event, say, one or two days later. It involves going back to the event and critically analysing it. Thus Reflection-On-Practice is bound with the notion of time. It can be done after the end of an event; we need to look back at what significant happened in the event. Reflection-On-Practice does not provide an immediate solution and is unnecessary (Schön, 1983).

While teaching in classroom settings, a teacher instructs with the help of an expert-generated concept map and will ask their students to draw their concept map on the same topic. The learner-generated map can be analysed later to find students' ambiguity in the related concept. Thus Reflection-On-Practice may be useful for future events and is important in the educational system because we also want long-term improvement.

Reflection-For-Action

It is fundamental and tells you to reflect on something you have already done, get involved, and observe it for a particular reason.

Reflection-With-Action

It is doing something; it is a conscious act whose goal is to analyse an event and develop understanding consciously. The word 'With' referred to do along with others. Reflection is an essential element of human thought. Different philosophers imagine and present new educational theories based on their reflective thinking. According to Denton (2009), Reflection is composed of various elements. Though those elements are not comprehensive, they are consistent with the philosophical and theoretical claims made by philosophers like Gustafson and Bennet (2002), Dewey (1997), and Locke (1974). One important thing to remember is that Denton (2009) also suggested that teacher educators should use Haberman's (1971) doctrine of interest as an alternative for Reflective practices beyond those suggested by Schon (1987) and Brookfield (1995).

Blackwell and Pepper (2008) examine the relationship of reflective practices for junior-level pre-service teachers' decision-making. Their study found no difference between the decision-making of the junior pre-service teacher who uses Concept Map and the junior pre-service teachers who only take traditional instructions. Despite the result that they do not find any

difference between teachers who use concept maps and those who receive only traditional instructions, they advocated using a common visual language like Concept Maps to help teachers better decision-making and instructional planning.

A group of researchers conducted qualitative research to see the effectiveness of Reflective Practices in the development of student teachers. Their study examines how teachers create opportunities for student teachers to develop their reflective practices during practise teaching sessions. The researchers found that Reflective Practice is a tool for students to explore themselves for their professional development (Mathew et al., 2017). In the teacher education class, the university instructor's use of a common tool, such as concept maps, provides a "common visual language" so that all pre-service teachers have a similar format when discussing and planning instructional practices.

According to Fraser (1993), Concept Maps are intended to externalise an individual's cognitive structure. Creating a Concept Map allows the individual to make new connections and identify concepts that should be added. For an understanding, we can say that: Concept Mapping "Makes Learning Visible" as the teacher can actually "see" what ideas the students have about a particular topic and evaluate students' learning and acquisition of concepts at a particular point in the learning process.

Students can have valid and invalid ideas (misconceptions) about a given topic/subject. A Concept Map can help reveal incorrect assumptions about the topic that can be changed at any time. The organisation of the Concept Map is highly integrated (Integration of Concepts) and hierarchical in a meaningful manner, which demonstrates a deeper understanding of the topic/subject (Jankowska, 2010).

Holcombe and Shonka (2010) also suggested using Conceptual Mapping for self-reflection. Conceptual Mapping is also a kind of Concept Map used to indicate relationships for better understanding. They conducted a study on students to find the impact of stereotyping on their life with the help of Conceptual Mapping and found that conceptual maps can be a useful tool for self-reflection. Conceptual Mapping makes students much more aware of themselves to reflect better in their day-to-day lives. Teachers and learners can use Conceptual Maps to stimulate reflection and establish a safe environment. Their study finds that teachers use several questions to model a conceptual mapping to enable the teacher's reflection.

Mason (1992) used Concept Mapping to develop a tool for reflective science instruction. Their study on pre-college science teachers reveals that teachers present many scientific terms in a linear, disconnected manner. Teachers must break this cycle in science education to improve instruction and educational value. They conducted a two-year study to investigate the use of Concept maps to rethink their content knowledge by teachers (Mason, 1992). Their study concluded that concept mapping could be used as a tool for reflective thinking so that teachers can improve their content knowledge and enhance their professional competence.

Kratal and Kici (2020) study the reflective capabilities of Concept Maps and drama to reflect their knowledge of Information Communication Technology. According to them, pre-service teaching is the most crucial part in the process of becoming a teacher. Concept mapping and drama can help pre-service teachers in professional self-awareness and understanding by

creating spaces for their cognitive and emotional domains. They suggested the use of Concept Maps and integration of drama in course content for reflection so that they can be made more self-aware of their ICT knowledge.

Kandiko, Hay, and Weller (2012) study the use of Concept Maps in the Humanities to facilitate reflection. They try to find the relationship between public and personal learning. They used the mapping technique in university teaching in the Humanity subject. They Use Concept Map as a pedagogical tool for reflective learning and collected data through a longitudinal study on Concept Mapping. With the help of this data, they established a theory that finds a relationship between public and personal learning. Hwang, Sung, and Chang (2016) also studied the effect of Concept Mapping based interactive activity on reflective style and learning performance in Junior High School law courses. Persbimer (2015) also measure growth in reflective pedagogical decision-making on pre-service teachers' conception. Lim et al. (2003) also used a semantic mapping strategy in kindergarten teacher education to develop reflective thinking skills (Kandiko et al., 2012).

Karunanayaka; Naidu; Rajendra and Ratnayake (2017) point out the value of reflection for professionals. Teachers use Concept Maps to convey their understanding to their students and reflect on them better. According to them, Reflective Practices in teaching make teachers more self-aware and help them find the link between theory and practice by attentively evaluating their personal experiences. These own experiences may be the feedback from others, the progress of their students, or the self-evaluation of teachers for themselves.

Thus, the infusion of the Concept Mapping Technique in Teaching helps to make the students' knowledge of the subject more transparent. Concept Maps can be useful, engaging, and rewarding for the students, significantly when the teacher promotes the integration of new information with the learners' existing cognitive structure. The Concept Mapping technique gives students a valuable opportunity to pause and reflect on topics that the teacher rarely explicitly addresses verbally. A substantial body of empirical evidence would not only provide reflective educators with the knowledge needed to develop effective pedagogical strategies, but it would also provide Reflective Education with much-needed credibility and recognition as a serious discipline.

METHODOLOGY

Although the methodology comes after the literature review, since the research question demands an in-depth and systematic analysis of literature, the nature of the present article will be narrative. However, the researcher begins with a systematic approach but realises later that it is challenging to conduct a systematic literature review in this study since both the terms are extremely diverse and descriptive. These two terms are also conceptual, and it becomes crucial to understand these terms in detail along with the review process. So, we can say that the nature of this study will be a Conceptual-Narrative Review.

We will discuss it in detail here. As we already mentioned, this study demands a systematic approach; the researcher proceeded in the same manner and tried to find out the related literature. The researcher searched articles on ERIC, ScienceDirect, PsycINFO, etc. At first, the researcher started with the search term "Concept Mapping" on ERIC, which returned 3969

results. However, the researcher was only interested in Peer-Reviewed full-text articles. Narrowing the result, it returned 510 full-text Peer-reviewed articles. Next, the researcher searched for the term "Reflective Practices", which yielded 1399 Peer-reviewed full-text articles. Next, for the search term "Concept Mapping for Reflective Practices", the researcher got 3940 results. The researcher's results are too diverse for the "Concept Mapping" search term. From these results, the researcher concludes that Concept mapping is used in numerous ways in different subjects, from Nursing to Science and Mathematics. The same is true for the search term "Reflective Practices". But for, the search term "Concept Mapping for Reflective Practices" returned 3940 results which means instead of narrowing the result, it returned the combined results of the terms "Concept Mapping" and "Reflective Practice". Despite a large number of results (3940), most articles were discarded by looking at titles and abstracts.

After this researcher started with the search term "Concept Mapping" on ScienceDirect, which gives 24094 Review Articles, 218921 Research Articles, 31499 Book chapters, and 4580 Encyclopaedias, after that limiting the results to subject criteria "Social Sciences" researcher got 1310 Review Articles, 20953 Research Articles, 1363 Book chapters, and 808 Encyclopaedias. Further, limiting this result on the basis of the year; between 2000 to 2021, there were 1005 Review Articles, 16332 Research Articles, 959 Book chapters, and 808 Encyclopaedias, and between the years 2010-2020, there were 866 Review Articles, 12883 Research Articles, 512 Encyclopaedias, and 614 Book chapters. The above data tells that between 2000 to 2010, there were 139 Review Articles, 3449 Research Articles, 296 Encyclopaedias, and 345 Book chapters. This data suggests that the total number of Review Articles between 2010- 2020 is 866, almost six times the previous decade. The total number of Research Articles between 2010-2020 is 12883, approximately four times its last decade (3449). The increase in the total number of Encyclopaedias between 2010-2020 is 512, which is just more than 1.5 times of its previous decade, 2000-2010, and the increase in Book chapters between 2010-2020 is 614, which is also more than 1.5 times compared to 2000-2010.

Now, the term "Reflective Practices" yielded 8572 Review Articles, 76644 Research Articles, 1960 Encyclopaedias, and 12229 Book chapters, along with a total of 1593 articles in the "Teacher and Teacher Education" category; the category which was absent earlier. Further, limiting the results based on subject criteria, there are 1005 Review Articles, 20263 Research Articles, 376 Encyclopaedias, and 1887 Book chapters in the "Social Science" category, and 1593 articles in Teacher and Teacher Education category. Further limiting the result for 2010-2020, it yielded 820 Review Articles, 14491 Research Articles, 271 Encyclopaedias, 516 Book chapters, and 791 Teacher and Teacher Education articles. Further, limiting the search between 2000-2010, we get 121 Review Articles, 3405 Research Articles, 105 Encyclopaedias, and 182 Book chapters with 440 articles in Teacher and Teacher Education. Looking at the above data, we can infer that the total number of Review articles between 2010-2020 is 820, approximately 6.7 times that of the previous decade. The Research Article between 2010-2020 is 14491, more than four times of its previous decade, 2000-2010. The number of Encyclopaedias in 2010-2020 is 271, more than 2.5 times that of the previous decade, i.e., 2000-2010. Moreover, if we talk about Book chapters, it was 576 in 2010-2020, more than three times its previous decade (2000-2010). Further, for the search term "Concept Mapping for Reflective Practices", the researcher got 891 Review articles, 5300 Research articles, 272 Encyclopaedias, 1373 Book chapters, and 129 articles in the "Teacher and Teacher Education" category. Further limiting the result based on the subject "Social Science" returned 141 Review articles, 1765 Research

articles, 51 Encyclopaedia, 125 Book chapters, and 129 articles in Teacher and Teacher Education. Further limiting the result between the years 2000 to 2010, the researcher got 10 Review articles, 255 Research articles, 19 Encyclopaedia, and 26 Book chapters with twenty-three articles in Teacher and Teacher Education. Between the years 2010-2020, the researcher got 100 Review articles, 1192 Research articles, 32 Encyclopaedias, 788 book chapters, and 73 articles in Teacher and Teacher Education. The search result of ScienceDirect for different terms is represented in Table 1.

RESULTS AND DISCUSSION

Previous research shows a strong relation between Concept Mapping and Reflective Practices. Reflection is a part of pedagogical content knowledge in the educational system. Concept Mapping and Reflective Teaching share the same common characteristics, and the underlying principles behind both are the same: Constructivism, metacognition, and pedagogical reasoning (Novak & Govin, 1984; Vodovozov & Raud, 2014). Reflection is a part of pedagogical content knowledge in the Education system. The aim is to encourage students to study skills relevant to their speciality and extra knowledge domain useful in the professional working field. Reflection is an essential component of the educational system (Farrell, 1995; Murphy, 2003). Many researchers suggested the use of concept mapping for knowledge construction and reflective practices (Mason, 1992; Hyerle, 1996; Blackwell & Pepper, 2008; Holcombe & Shonka, 2010; Kandiko, Hey & Weller, 2012; Mathew et al., 2017; Kratal & Kici, 2020).

We have discussed each Research question in detail above. So, it is better to answer all these research questions at once and conclude the findings. Teaching and learning are two common components of the educational system, and they rely on each other. The theories we learn in books always fail to answer daily life problems. So, in the practice field, we must reflect on these problems and make appropriate changes to solve those everyday life problems. Thus, continuous improvement through reflection is necessary for the educational system. We can say that students are nothing but the reflection of teachers.

According to Reflective teaching, the achievement or performance of a student should not be an indicator of a teachers' ability. Student performance or achievement is related to students themselves that how well they reflect on in a particular situation and is their own ability. Having knowledge and conveying knowledge are two different things, and an educator must possess both. You can be a good scientist, researcher, engineer, doctor, or other intellectual if you have knowledge. But if you cannot transfer it to others, you should avoid being a teacher. Transferring knowledge is related to teachers' reflection on how well they convey their thoughts to their students, while a student's performance is students' reflection on themselves.

Reflection is not only limited to teacher-student, but from the fundamental problem of society to more severe problems of the nation, everywhere reflection plays an important role. In the Educational system, reflection is vital to a child's need to highly researched scientific problems. It helps to solve them and direct them in curriculum development, content development, educational planning, and making appropriate educational strategies. The same is true for Concepts Maps too. The government of all countries is now giving importance to Reflective practices and making it possible for teachers to reflect at every level of the educational system. Some examples include training of teachers, the use of technology, and many more. The use

of the concept map is one among them. Teachers can use it to convey their thoughts to their students, or students can also reflect through these mapping techniques and give feedback to improve the entire educational system.

Now we can think, Reflective teaching as teacher education that talks about teaching and learning and plans those strategies and pedagogical tools necessary for today's scenario. Concept Mapping thus becomes a valuable tool that teachers can use for teaching and learning, while on the other side, it states the interconnectedness between different factors. Therefore, Concept Mapping supports Reflective Practices, enabling a person to do his best by evaluating himself to improve the educational system. Thus, Concept Mapping becomes an effective tool for conceptualising and reflecting on one's capabilities to understand one's wellness and that of others.

One important thing that I want to convey through this article is that, at present, the selection of a teacher is based on merit or API, which includes an interview later on. But it was often seen that there is always a lack of transparency in the interview process. In an interview, it was often seen that the outcome of the interviewer or employer is not shared with candidates. This kind of practice reduces the transparency of the selection process. It should be avoided so that an interviewee can Reflect-on and improve their performance and do better in the future. A person should always keep trying to find new tools like Concept Map to Reflect-on better in their life.

Further, this study recommends that one should always keep trying to uncover more tools and elements for reflection in any profession to improve it. Reflection in any field brings transparency, results in higher performance, and decreases corruption, making the entire system transparent and resulting in an improved system. To learn Reflection ideas and concepts and apply them in practical life are two different aspects. So, everyone should continue attempting that what we study in books can simply be implemented in real life, and we can call ourselves an intellectual.

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Table 1
ScienceDirect Search Result for corresponding terms

Article/Doc Type	Whole database	Social Science			Teacher & Teacher Edu.		
Search term: Concept Mapping							
	No. of Articles						
		All time	2000-2010	2010-2020	All time	2000-2010	2010-2020
Review	24094	1310	139	866	NA	NA	NA
Research	218921	20953	3449	12883			
Encyclopaedia	4580	808	296	512			
Book/Chapter	31499	1363	345	614			
Search term: Reflective Practices							
		All time	2000-2010	2010-2020	All time	2000-2010	2010-2020
Review	8572	1005	121	820	1593	440	791
Research	76644	20263	3405	14491			
Encyclopaedia	1960	376	105	271			
Book/Chapter	12229	1887	182	516			
Search term: Concept Mapping for Reflective Practices							
		All time	2000-2010	2010-2020	All time	2000-2010	2010-2020
Review	891	141	10	100	129	23	73
Research	5300	1765	255	1192			
Encyclopaedia	272	51	19	32			
Book/Chapter	1373	125	26	788			