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From Pedagogy to Heutagogy: Leveraging Double-Loop Learning to Foster Metacognition in Secondary Social Science Education in Bangladesh

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ABSTRACT

Double loop learning and heutagogy have an impact on students' critical thinking and self-assessment. There are three methods of learning: heutagogy, andragogy, and pedagogy. Heutagogy goes in the opposite direction and finds answers to questions like why to solve this problem, whereas students currently only find answers to questions like how to solve this problem due to the completion of learning through pedagogical methods. So, learning starts by asking students why they will solve a topic before studying it, and if the teacher teaches a topic in the classroom, the student can begin learning through their own thinking and evaluation. At this stage, the student's metacognition is triggered, allowing him to critically assess the subject and learning strategy, guaranteeing double loop learning. The 2012 Curriculum Framework, an objective-based curriculum, is used to guide students' learning in Bangladesh's present educational system. By motivating students to memorize particular concepts using Bloom's Taxonomy, their learning was completed. Students are consequently unable to improve their own abilities in self-evaluation. Students are not able to become proficient in this subject even when pedagogical approaches are used to teach them how to overcome problems during the learning process. In the context of social science education, this study investigates how to broaden the heuristic learning path by implementing double loop learning and metacognition in the classroom.

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1. Introduction:

Self-determined learning, or heutagogy (Hase & Kenyon, 2000), is a new educational paradigm that prioritizes reflective practice, learner autonomy, and capability development. Heutagogy promotes flexibility and lifelong learning by giving students authority over their learning objectives, methods, and results, in contrast to pedagogy and andragogy. As educational settings are transformed by digital and AI-

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enhanced tools, heutagogy presents a viable approach for encouraging flexibility and lifelong learning (Panta, 2025). This framework is particularly relevant in digitally mediated education, where rapid change demands flexible, lifelong learning strategies (Hase & Kenyon , 2000).

Educators today are tasked with developing lifelong learners who can survive and thrive in a global knowledge economy – learners who have the capability to effectively and creatively apply skills and competencies to new situations in an ever-changing, complex world (The World Bank, 2003; Kuit & Fell, 2010). Pedagogical, even andragogical, educational methods are no longer fully sufficient in preparing learners for thriving in the workplace, and a more self-directed and self-determined approach is needed, one in which the learner reflects upon what is learned and how it is learned and in which educators teach learners how to teach themselves (Peters, 2001, 2004; Kamenetz, 2010).

(Zamroni and Mahfudz,2009) identified four methods to enhance students' critical thinking skills...": the implementation of specialized learning models, assigning book critiques, utilizing narratives, and employing the Socratic questioning technique. The problem-solving model is a learning framework that can be utilized to enhance students' critical thinking abilities. Trisnowati and Firdaus (2017) demonstrated that the problem-solving paradigm instructs pupils to confront and resolve issues adeptly .The model was further refined into a double-loop problem-solving framework. (Shoimin, 2014). According to Huda (2014) that model was developed based on Argyris's 1976 theory, which emphasizes the resolution of complex and unstructured problems, thereby functioning as an effective problem-solving instrument.

Metacognition can be succinctly defined as thinking (Bogdan, 2000; Flavell, 1999; Metcalfe, 2000) Yet it also encompasses the ability to reflect on and analyze thought processes, derive conclusions from such analyses, and apply the acquired knowledge in practice. (McAuliffe, 2009) and others acknowledged the learner empowerment intrinsic to heutagogy, asserting that the teacher or facilitator must "Instructors must maintain an appropriate distance to encourage learners to actively engage in their environment through discovery related to their interests and needs (Bruner, 1961)."while also underscoring the importance of remaining a vital component in aiding learners to interpret their world.

A heutagogical approach in middle school empowers students to become self-directed learners; rather than relying solely on teacher-led instruction, students actively participate in the design of their own learning pathways. This involves fostering critical thinking, problem-solving, and reflective practices. For instance, students might be given broad learning objectives and then choose how they want to explore those objectives, selecting resources, projects, and assessment methods that align with their interests and learning styles. This promotes ownership of their education, encouraging them to develop metacognitive skills and become lifelong learners, preparing them for the increasing autonomy required in higher education and professional settings.

Several researchers (Argyris & Schön, 1974; Blackman et al., 2012; Clark, 2021; Freeman & Knight, 2011; Houchens et al., 2012; Spoelstra et al., 2014) have investigated the application of double-loop learning within organizational and work-based settings while performing various tasks (e.g., reading comprehension or problem solving) often focusing on a separate component of metacognitive skills (e.g., personal, team and company development cycle). Later the researchers try to adapt the double loop learning in several context in educational setting (e.g., problem-based gaming performance on double loop learning, spatial thinking ability, double loop learning for questioning specific problem like environmental pollution that can enrich the student’s thoughts regarding the lesson.

Multiple issues hinder the advancement of student metacognition within the secondary social science curriculum in Bangladesh, especially regarding social discourse. These encompass: a reliance on rote learning, a deficiency in interactive pedagogy, curriculum content and design, inadequate hardware and software based instructional design, and assessment practices. Consequently, pupils are unable to engage in transformative thought concerning social discourse.

In order to bridge this gap and discourage traditional rote learning in social science education, the scope of double loop learning and metacognition has been explored, which can be incorporated into the social science teaching and learning process in Bangladesh. By following this approach, the critical perspective of the student will be cultivated and the teacher's teaching will be directed from one way to a two-way direction.

2. Methodology

This study employs both primary and secondary sources, including academic and documentary analyses, to investigate double loop learning and the efficacy of metacognition development within the framework of heutagogy. The literature evaluation looked into "grey literature," which includes peer-reviewed papers, reports, policy documents, and academic publications, concentrating on pertinent subjects such as teacher preparation, psychosocial support, community participation, and educational solutions (Shohel, 2022). The document analysis encompassed a synthesis of pertinent materials, including research findings, training resources centered on double-loop learning within organizational and educational contexts, policy documents, and monitoring and evaluation reports.

Narrative inquiry method was used to collect primary data. Narrative inquiry is widely recognized as a viable approach to conducting qualitative research. Narrative and storytelling have long been perceived as pedagogical tools (Coulter, C., Michael, C., & Poynor, L., 2007). Barone (2001) has traced the prominent publicity of educational story-telling as a form of narrative inquiry. Drawing on the work of (Elbaz, 1983) , they advocate research methods in which teachers construct a life line that chronicles personal and professional events, including dates and feelings in order to move into the telling and retelling of their stories. During my internship as a facilitator at the secondary level, I observed students' metacognition through the lens of double-loop learning. My dual role as a teacher and researcher provided a distinctive perspective, facilitating my engagement with narrative inquiry. The ethical consideration of this dual position, especially regarding students' developmental domains and the surrounding context, were meticulously evaluated. This teaching practice offered a realistic environment for initial observation. The obstacles and achievements experienced in the classroom directly shaped the formulation of the study framework.

The employed data analysis tool is the synthesis matrix. The synthesis matrix is a table or diagram utilized to categorize and classify many arguments from multiple articles, integrating distinct aspects to derive conclusions about the overall piece (Ridwan et al., 2021).This study aims to

provide a table with columns for the specific theme, research design, and findings. The first steps in the research process are to choose the methodology, the tools, the sampling strategy, and the research samples. The next step is to analyze the data to come up with results.

3. Literature review

3.1 Curricular modifications in secondary education in Bangladesh

On 2012 Bangladesh take objective model of curriculum which was first introduce at 1995 in Bangladesh. Since that time, significant transformations have occurred across multiple social, cultural, economic, and political domains, particularly in knowledge, science, information, and communication technology, both nationally and internationally. Currently with the alterations, the educational requirements of students are evolving swiftly. (Tyler, 2013)posits that the aim of objective based curriculum is to cultivate learning that is significant and beneficial to students. This curriculum advocated for constructivism in teaching approaches. Each student uniquely constructs information and concepts by reflecting on personal experiences and environments. Upon encountering something novel, an individual evaluates it through the lens of their prior knowledge and experience. Thus, the individual attains new concepts or information. If the new element is deemed irrelevant during the evaluation, he dismisses it. Jonassen et al. (1998) contend that the teacher's duty in constructivism is to assist pupils in generating new concepts. Not solely to furnish theories and knowledge. The instructor will assist the students in problem-solving or inquiry, enabling them to formulate and evaluate their own hypotheses, make decisions, and communicate their findings within a collaborative learning setting. Jonassen (1997) posits that students progressively evolve into proficient learners by self-questioning and validating the efficacy of their used methods and strategies, ultimately mastering "how to learn". Consequently, they evolve into perpetual learners.

This curricular framework employs a social constructivist methodology for the teaching-learning process, integrating connectivism as the primary learning idea and practical strategy, with hands-on training at its foundation. The methodologies and strategies employed in experiential learning encompass joyful learning, task-orientated or tactile learning through the comprehensive engagement of the five senses, project-based, problem-based, and challenge-based learning, collaborative learning, inquiry-driven learning, a synthesis of self-directed individual, pair, and group work, as well as process and context-orientated learning as opposed to subject-centric learning, and the utilization of online learning platforms.

3.2 Construct of Metacognition by Double Loop Learning

Studies demonstrate that metacognition is a significant predictor of learning outcomes. Metacognitive skills positively correlate with learning. According to Glaser (1984), which examined how advancements in psychological science about human cognition and problem-

solving have informed instructional techniques aimed at enhancing higher-order skills. Process-oriented programming, problem-solving heuristics, and logical reasoning in the context of basic skill learning can enhance higher-order thinking (Glaser, 1984). Metacognitive skills can be acquired through educational institutions to enhance student learning. A supplementary study was conducted to evaluate the efficacy of teaching metacognition in educational institutions. The research identified a beneficial effect on the advancement of student outcomes. This research also recommended the incorporation of metacognitive instruction into educational policy and practice Perry et al. (2018) argue that Metacognitive skills are linked to active learning, critical thinking, reflective learning, problem-solving, and decision-making. Metacognition facilitates learners' comprehension of their optimal learning methods. Metacognitive practice assists learners in planning, monitoring, and assessing their learning progress.

Double-loop learning underscores reflection, an essential element of metacognition. Consistent reflection on learning events enables individuals to discern patterns, biases and opportunities for enhancement. On heutagogy reflecting upon and critically thinking about what has been learned and the process of learning, in the form of double-loop learning (metacognition), is the principle of heutagogy (Blaschke, 2016)**.** Also, building on constructivist and humanistic visions of learning, heutagogy also draws on the more recent advances in neuroscience that have shed considerable light on how it is people learn at a cellular level.

4. Findings

The findings derived from the narrative inquiry and document analysis will be presented in two sections:

1) Components of metacognitive strategies as integrated into the teaching-learning process. 2)Implementing metacognitive strategies in the classroom within double loop learning context.
2) The findings are presented through thematically structured tales across diverse content categories. Minor interactions between teaching and learning have become apparent, elucidating how certain heuristics may facilitate progress.

4.1 Components of metacognitive strategies as integrated into the teaching-learning process.

At the start of a learning activity, teachers should make learners aware of strategies, rules and steps in problem solving. Time restrictions, goals and ground rules connected to the learning activity should be made explicit and internalized by the learners. Consequently, learners will keep them in mind during the learning activity and assess their performance against them. During the learning activity, teachers can encourage learners to share their progress, their cognitive procedures and their views of their conduct. As a result, learners will become more aware of their own behavior and teachers will be able to identify problem areas in the learners' thinking (Costa,

1984). When learning is planned by someone else, it is difficult for learners to become self-directed (Blakey, Spence , 1990) .

During the learning process, information pertinent to the subject matter should be acknowledged through a metacognitive lens . The resemblance between conditional knowledge and double-loop learning suggests that texts focused on conditional knowledge will enhance the student's metacognitive skills throughout the learning process. This approach prompts the student to confront questions regarding the rationale behind specific processes rather than merely the methods, thereby enabling them to assess the relevance of the material studied.

"Declarative knowledge, conceptually defined as 'knowing what'—comprises the factual information, concepts, and principles that a learner possesses. Students comprehend their knowledge, including their strengths and weaknesses as learners. A pupil aware of their difficulty in memorizing historical dates. Procedural knowledge—conceptually understood as 'knowing how'—refers to the knowledge of specific techniques, methods, and criteria for determining when to execute various procedures. When a student knows how to solve a problem step by step, then procedural knowledge is developed in him. Procedural knowledge refers to the skills, techniques or methods required to perform a specific task. It is the knowledge of "HOW" to do a task. This knowledge is action-based, ensures step-by-step progress, automaticity. It is organized into three stages: cognitive stage, collaborative stage, autonomous stage. Conditional knowledge: It acts as a bridge between procedural and declarative knowledge. Conditional knowledge is the level of metacognition that teaches us when and why to use a particular strategy. The main features of conditional knowledge are situational awareness, strategy selection, and rationality.

At the secondary level, students are in a developmental phase, wherein the nature of knowledge is delineated by the teacher prior to the initiation of the learning process. Students are categorized into four primary groups based on distinct learning types: tacit learners, aware learners, strategic learners, and reflective learners. In this instance, it is evident that tacit learners find the acquisition of conditional knowledge to be laborious and challenging, necessitating the management of their learning process from declarative knowledge to subsequent stages, whereby the attainment of conditional knowledge will enhance their metacognitive skills**.** In this case, an teacher can impart conditional knowledge to reflective learners. Considering these topics, the lessons within the social science curriculum for grades 9-10 can be discerned through this knowledge, facilitating an effective teaching-learning process that enhances the metacognitive skills of all student types, from tacit to reflective learners.

Table 1: classifications of knowledge in relation to metacognitive knowledge

Declarative knowledge Knowing what	**Procedural knowledge** knowing how	**conditional knowledge** knowing why and when
● Understanding diversity, significance, and interconnectedness Social, national, and	● Interconnectedness Sustainable Development and	● Articulating and comprehending the viewpoints and assertions of oneself and others Local and global contexts.

international frameworks Physical and emotional health. ● Global acknowledgement of bias, manipulation, and misinformation in media platforms. ● participating in community service, advocacy, and diverse types of civic engagement. ● Techniques for organizing historical events in precise chronological order and understanding causal links. ● Understanding the structure of governance, civic rights and responsibilities, and essential legal ideas. ● Comprehension of essential economic concepts including supply and demand, inflation, and diverse economic systems. ● Grasp the social structures, cultural norms, societal inequalities, and group dynamics. ● Define fundamental principles of human behavior, encompassing motivation, perception, and learning. Understanding the essential tenets of major world religions and intellectual systems. ● Acquaintance with the Universal Declaration of	Natural Human Rights. ● Employing online databases, mapping software, and diverse technology tools for the conduct of social scientific research. ● Understanding cultural diversity, the concept of culture, and the functional dynamics of many civilizations. ● ability to critically assess media and understand its influence on society. ● acquire the methodology for critically analyzing historical records, pictures, or primary sources to extract pertinent information and discern bias. ● obtain procedural knowledge in formulating interview questions, executing interviews ethically, and analyzing qualitative data. ● acquire the skills to evaluate the authenticity and dependability of diverse sources, including online materials, academic journals, and news pieces. ● cultivate the capacity to construct well-substantiated arguments utilizing	● Identifying circumstances in how civic engagement can affect policy alterations. ● Certain historical interpretations possess greater validity than others, contingent upon context and accessible information. ● Why certain civic efforts are more efficacious in realizing particular social change. ● Why various environmental strategies are more efficacious in alleviating the impacts of climate change in particular places. ● Evaluate when democratic system more advantageous for a society compared to an authoritarian regime, and what determinants affect this?” ● Conditions that facilitate beneficial cultural interaction through the dissemination of cultural ideas, and when does it lead to cultural homogenization or conflict? ● Why non-violent protests prove more effective than violent protests in facilitating social change? ● In what situations do laws successfully foster social order, and when do they reinforce social inequality? ● When does media function as an instrument for public enlightenment, and when does it transform into a conduit for misinformation? ● When does a strong sense of national identity promote unity, and when does it lead to exclusion or conflict with other groups?

Human Rights and the tenets of human rights violations. ● Comprehension of population dynamics and the implications of such alterations. ● Comprehending the worldwide allocation of resources and its resultant ramifications.	evidence and logical reasoning. ● skills in utilizing mapping tools and techniques to visualize and analyze spatial patterns of social phenomena. ● engage in social simulations that facilitate their comprehension of intricate social interactions.	● When are international human rights legislation successful in safeguarding persons, and when are they constrained by national sovereignty? ● Discernment on when to employ statistical data as opposed to anecdotal evidence to substantiate an argument, contingent upon the context of the discourse. ● Understanding when to utilize knowledge of democratic versus authoritarian regimes in the analysis of political actions. ● Determining why scientific data as opposed to social science data in the evaluation of environmental policy impacts.

Metacognition is typically categorized into two different yet connected domains. John Flavell (1979) categorized the metacognitive domain into two primary dimensions: metacognitive knowledge—the awareness of one's own cognitive processes—and metacognitive regulation—the capacity to monitor and control those activities. These components function in tandem to provide a framework for learning theory. Specifically, Flavell identified three distinct categories of metacognitive knowledge, noting that knowledge awareness involves a learner's comprehension of their current expertise, the recognition of cognitive gaps, and the identification of learning objectives. This category may also encompass an awareness of others' knowledge. Furthermore, Flavell (1979) distinguishes between the comprehension of task variables—the demands and prerequisites of a cognitive activity—and strategic variables, which involve the awareness of specific methods used to facilitate learning and information processing.

Incorporating metacognitive regulation into a secondary social science curriculum requires the establishment of learning settings that promote students' reflection on their cognitive processes, assessment of their comprehension, and modification of their learning strategies. Inquiry-based projects promote students to formulate questions and subsequently refine them during the learning process.

The integration of the issue into secondary level sociology instruction will need much time; yet, it is a worthwhile endeavor that benefits both students and teachers. To enable students to assess the relevance of the subject prior to commencing instruction on a topic from the developmental phase. Table 2 presents instances of self-questions that metacognitive secondary students in grades 9 to 10, specifically in social sciences, may pose during the planning, monitoring, and evaluation of their learning within the framework of a single class session, a homework

assignment, an examination, or an entire course. This compilation of enquiries does not encompass the entirety of metacognitive regulations, nevertheless it offers foundational points for facilitators aiming to engage students in explicit discussions on metacognitive methods. These enquiries may be disseminated directly to students and/or integrated into specific assignments. The following are few examples of how student self-questions might be explicitly utilized in teaching a social science course.

Table 2: Sample self-questions to promote student metacognition about learning.

Activity	Planning	Monitoring	Evaluating
Class session	● What am I going to learn from this session? ● Do the subjects in this course resemble ● those I have already studied? ● How does what I'm studying in this class relate to my everyday life? ● What objectives will the class session aim to achieve?	● Is there anything that remains unanswered regarding my intended inquiry? ● Is this anything that interests me? Why not? Why don't I like this text? ● What queries are coming up for me in the course? Am I taking them somewhere? ● What enquiries do I currently possess regarding this subject that I seek to explore further?	● What did I hear today that is in contrast with my regular life thoughts? ● How did the ideas of today's class session effect my societal thoughts? ● What do I need to actively go and do now to get my questions answered and my confusions clarified? ● What did I find most intriguing on this class which associated with daily life? ● Did today's class session fulfil my educational requirements?
Learning task	● What is the instructor's objective in assigning this work to me? ● Am I permitted to complete this work in a social environment outside of the classroom? ● What actions must I undertake to properly complete this task? Will this work enhance my social environment? ● What resources are required to accomplish the task?	● What strategies am I using that are working well or not working well to help me learn? ● What other resources could I be using to complete this task? What action should I take to get these? ● What is most challenging for me about this task? ● What could I do differently assignment to address these	● What did I hear today that is in contrast with my regular life thoughts? ● How did the ideas of today's class session effect my societal thoughts? ● What do I need to actively go and do now to get my questions answered and my confusions clarified? ● What did I find most intriguing on this class which associated with daily life?

	How will I ensure I possess them? ● If I have previously undertaken a similar task, how might I enhance my performance this time ?	challenges and confu sions?	● Did today's class session fulfil my educational requirem ents?
Assessment	● What strategies should I use to study for the assessment? Textbook-based learning or hands-on experience? ● Where should I spend most of my time studying and gaining experience? Textbooks or online learning? ● Am I prepared to answer all the questions in the course material based on my current understanding ?	● How organized are all the materials I have gathered for the exam? ● Do I find my learning similar to the learning outcomes of the topics I have studied based on my own understanding? ● Am I having problems with my motivation to study? If so, have I considered why I am taking this course? ● Have I resolved any confusion I had? How have I been able to clear them up?	● What are the shortcomings in my test preparation? ● Is there anything that didn't work well that I shouldn't do next time or that I should change? ● Which questions did I not answer correctly? Why? How did my answer compare to the suggested correct answers? ● Are the questions I didn't answer correctly inconsistent with my learning needs?
Overall course	● Why is it important to learn the topics in this course? ● How does success in this course relate to my real-life goals? ● What solutions have I found to the problems I encountered in this course that are focused on social issues? How was my time spent in this course? ● What do I want to be able to do by the end of this course?	● In what ways is the teaching of this course helpful to my learning? ● What methods can I use to improve my learning in this course? ● In what ways is the teaching of this course not helpful to my learning? How can I change it and implement new strategies? ● How interested am I in this course? How confident am I in my learning? What can I do to increase my interest and confiden ce?	● What will I retain after five years after completing this course? ● What guidance would I offer a peer regarding maximizing their learning from this course? ● What methods may I employ to assist my classmate in comprehending a lesson they find difficult? ● How would I modify this course if I were to instruct it? ● What insights on learning methodologies from this course may I apply to my future social studies classes? Regarding

my
professional journey.

Inspired by (Ertmer P. A., & Newby T. J., 1996), (Schraw, 1998), and (Coutinho, 2007).

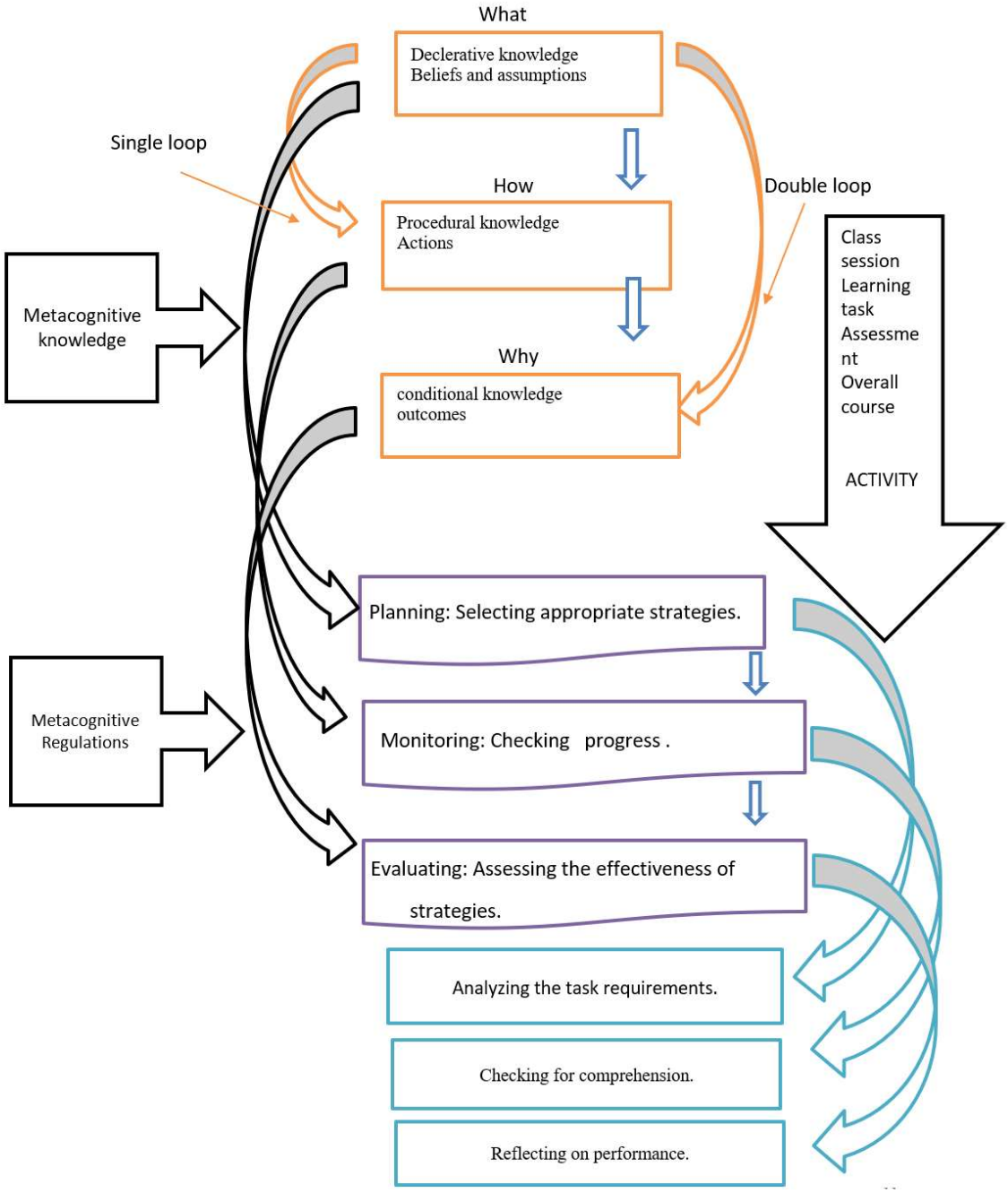

Figure 1: Self-directed metacognitive model for creating pathways of heutagogy

4.2 Implementing metacognitive strategies in the classroom within double loop learning context

The preliminary phase of this segment has outlined the degree of incorporating metacognitive elements in the classroom from a cohesive viewpoint of pedagogy and learning. The joint endeavors of the teacher and student can facilitate self-directed learning in the classroom, as evidenced by this scenario. This stage will give the verdict on the application of instructional methods for implementing metacognitive strategies in the classroom within the framework of double loop learning. Hardware and software methodologies are primarily referenced within the realm of instructional technology. Based on secondary document research and actual experience, it is evident that the software approach is more effective for cultivating students' metacognitive skills. The software approach facilitates the development of student skills in any environment by enabling the creation of a double-loop learning framework through the enhanced application of TPACK skills by teachers. In contrast, hardware approaches necessitate various educational materials that may not always be accessible in the classroom. The major strategies in this instance are:

4.2.1 Establishing a rapport conducive to learning

Boekaerts and Simons (1995) define metacognitive strategies as the choice's learners execute prior to, during, and subsequent to the learning process. Strategic Planning at the commencement of a learning activity, teachers should inform students of tactics, regulations, and procedures in problem-solving. Time constraints, objectives, and established guidelines pertaining to the learning activity must be clearly articulated and assimilated by the learners. As a result, learners will consider them throughout the learning activity and evaluate their performance in relation to them. During the educational activity, teachers can prompt students to disclose their advancements, cognitive processes, and perspectives on their behavior. Consequently, students will develop greater awareness of their behavior, and teachers will be able to pinpoint areas of difficulty in the students' cognition (Costa, 1984).

4.2.2 Formulating enquiries pertaining to the domains of learning

Muijs and Reynolds (2000) assert that the integration of existing knowledge with new concepts should occur throughout the lesson, rather than solely with the introduction of a new concept. The amalgamation of existing information and novel concepts allows the learner to comprehend the cohesive and interrelated essence of knowledge, hence fostering a deep comprehension of the subject matter (Ornstein and Hunkins, 1998).

According to Muijs and Reynolds (2000), when new information is combined with old information, the brain converts it into long-term memory. Students form their own opinions by analyzing the information. This is called: evidence-based decision. For example: Based on the information, the

student proves that "climate change will change people's professions". This learning method can be conducted in 5 steps. 1) Formulating curiosity-provoking questions, 2) Collecting information or evidence 3) Analyzing and evaluating information 4) Making decisions and making arguments 5) Presenting results and taking effective action.

4.2.3 Scenario analysis within double loop Setting

When a student is exposed to a new or complex situation outside of traditional rote learning, new insights are created within him. When the information in the textbook and real-life experience conflict, cognitive dissonance is created among students. Through situational learning, the teacher uses this inconsistency to encourage the student to search for deeper truths. In this case, if a strategy is wrong, it is seen as an opportunity to change the strategy rather than seeing it as a failure. When students encounter a problem outside the familiar framework, their cognitive flexibility increases. Metacognition is considered the "internal coach" inside the human head. Most of the time, students think subconsciously, but when the teacher allows them to solve problems in different situations, they actively participate in it. In situational learning, if the whole class wants to reject a method, the teacher does not force them. Rather, he encourages them to think new things based on information from their previous experiences. This gets students used to collaborative decision making and democratic thinking .Textbooks often talk about an "ideal" situation. But the real situation is messy. When the student uses his own intuition and sees that it does not match the textbook, cognitive dissonance is created within him.

4.2.4 Contemplating verbally

In education, " Contemplating verbally" or reflecting on thoughts is a very powerful teaching technique. When teachers speak their doubts or arguments out loud while solving a problem (for example: "I see the pattern but I wonder if it could be done differently"), students learn that doubting or asking questions is part of learning. In this case, the teacher will ask questions in a way that does not limit them to just "yes" or "no" answers, but forces students to think from different perspectives. According to Lev Vygotsky, children first talk to themselves out loud (private speech), which later transforms into their internal thoughts. When solving complex or abstract problems, the brain is often overloaded with information. Orally speaking, the brain is forced to organize information step by step through peer collaboration. Teachers can implement this method in the classroom in 3 ways. Think pair share. In this strategy, the student will first consider by himself, then discuss it aloud with peers, and lastly with the entire class. Share with your classmates and teacher. reciprocal instruction. In this strategy, pupils assume the position of instructor and explain their reading process. Error Analysis The teacher will make deliberate mistakes and students will find them out through group and individual discussions.

4.2.5 Flipped method

Flipped classroom is a modern method of education that goes against the traditional teaching method. In this method, students read the assigned reading material in their class at home in advance, so that they can understand which topics are easy for them and which topics are difficult for them by rewinding them in the classroom. Since the students have already read the initial concepts at home, students can have in-depth discussions with the teacher and their classmates in the classroom. In a traditional classroom, students may not realize that a topic is difficult for them, but in a flipped classroom, students can create a confusion log or list of ambiguities by reading the material at home first. This forces them to check their understanding. For example, when a student writes "What were the economic causes of the French Revolution?", they can identify the limitations of their understanding. According to Bloom's Taxonomy, reading comprehension is a lower-level skill, as opposed to metacognition, since higher-level skills allow students to analyze and synthesize learning material through the use of the flipped method, which increases the level of higher order thinking skills in them. The flipped classroom makes students see tests not as a source of fear but as feedback. When students make mistakes on quizzes, they self-evaluate where the gaps were in their reading, thereby increasing their ability to learn from their mistakes through the use of metacognition.

4.2.6 Making deliberate choices

In deciding on a subject, the learning topic should be determined by giving priority to the student's preference. However, thinking about the outcome before making a decision is called anticipatory thinking. When a student adopts a mathematical method or takes a stand for a social policy, he should question what the outcome of that method will be. As a result, the student will refrain from making his emotional decisions. The role of the teacher will be like a mirror, if the student makes a mistake, he should present the result objectively without criticizing him. When the feedback is objective, the student does not become defensive, so he easily accepts his mistakes and learns from them. This improves their self-referential knowledge. In this process, the teacher is not just a provider of information but a facilitator. In this method, the teacher asks questions that challenge the student's current beliefs. For example: "If you think this policy is right, what do you think its impact will be on marginalized communities?" When the student struggles to solve a problem, the teacher will help him develop initial insights by giving small clues or signals. The teacher will help students determine the learning topic in 3 steps at this level: planning, observation, evaluation. When this loop is repeated, the student becomes aware of self-referential knowledge, that is, his own limitations and strengths.

4.2.7 KWL (Know, Want to Know, Learnt) chart

The KWL chart, created by (Donna Ogle,2003) is a method for assessing students' prior knowledge, determining the learning outcomes determined by the students after learning, and

evaluating what the students are learning. The KWL chart plays a role in the application of metacognition and the implementation of double loop learning. In this case, the student's individuality is maintained by determining the learning outcomes by the students, and the students determine the learning topics according to their own learning needs. The student's constructive learning is completed in this case by connecting the determined learning topic with prior knowledge. In contrast to the spiral curriculum, where the learning topic is presented strongly through repeated repetition of the same topic and strengthens the skills of the students, this teaching method expands the path of learning by connecting with prior learning, future learning, and evaluation of learning topics. In the third step, the student has the opportunity to self-assess, allowing the student to evaluate what new things they have learned in relation to their previous learning and identify learning gaps. Since double-loop learning explores why a learning object is learned, this method represents the reason why the learning object will be learned rather than how the learning object will be learned. In learning, it will help to make the student an active learner from a passive listener. As a supportive teaching method for the teacher, it helps to create learning outcomes. By focusing on three specific topics through KWL chart, there is specific information. When students answer questions like what they want to learn, their curiosity increases and their willingness to learn increases.

5. Design Recommendations

The results emphasize particular design elements within the theme that should be considered when fostering metacognition in social science classrooms. Figure 4 presents an overview that offers a more thorough instructional design for teaching and learning through recommendations. General design recommendations for all social science classroom fostering metacognition shapes:

Step1 PKT: Prior to initiating direct instruction, the teacher should ascertain the pupils' existing knowledge base. Consequently, the instructor will administer suitable assessments at this level to evaluate the students.

Step2 Identifying the attributes of the learner: (Perkins, 1992) delineated four tiers of metacognitive learners: tacit, aware, strategic, and reflective. 'Tacit' learners lack awareness of their metacognitive knowledge. They do not contemplate specific learning tactics and simply acknowledge their knowledge or lack thereof. We must first ascertain the characteristics of the learners, as tacit learners require guidance derived from procedural knowledge

Step3 Cataloging resources and limitations: The teacher will consider the suitability of the textbook according to the nature of the student on whom he wants to present information. Therefore, he will have to determine alternative sources of information. The main task at this level is to sort the content according to the needs of all the students in the classroom from sensitive to the needs of the class.

Step4 Determining the Nature of knowledge: The three categories of knowledge must be stratified based on the characteristics of the students previously identified. Consequently, the nature of knowledge should be defined according to the inherent differences among students in a class, enabling reflective learners to comprehend its applicability.

Step5 Content sorting: The student should initially be instructed in problem-solving through single loop learning, demonstrating the application of the problem and the appropriate timing for presenting the solution, before integrating double loop learning into the process.

Step6 Setting personal objectives: A comprehensive strategy delineating the roles of both the teacher and the students during instruction is necessary. The teacher-student interaction will be contingent upon the pedagogical approach selected by the instructor. In this context, metacognitive knowledge should be recognized as the teacher's process, while metacognitive regulation pertains to the student's process.

Step7 Synthesis and Implementation: By equilibrating the aforementioned decisions pertaining to instruction, the teacher formulates an action plan at this stage and executes that plan inside the classroom teaching activities, so including this stage into metacognitive regulation.

Step8 Evaluation of outcomes and system adjustment: the instructor assesses the students. This is the post-activity phase of instruction. In the concluding phase, the teacher will assess the data acquired from the evaluation and, if warranted, modify various components of the system and re-execute it. This update should be executed particularly from the second instance onwards.

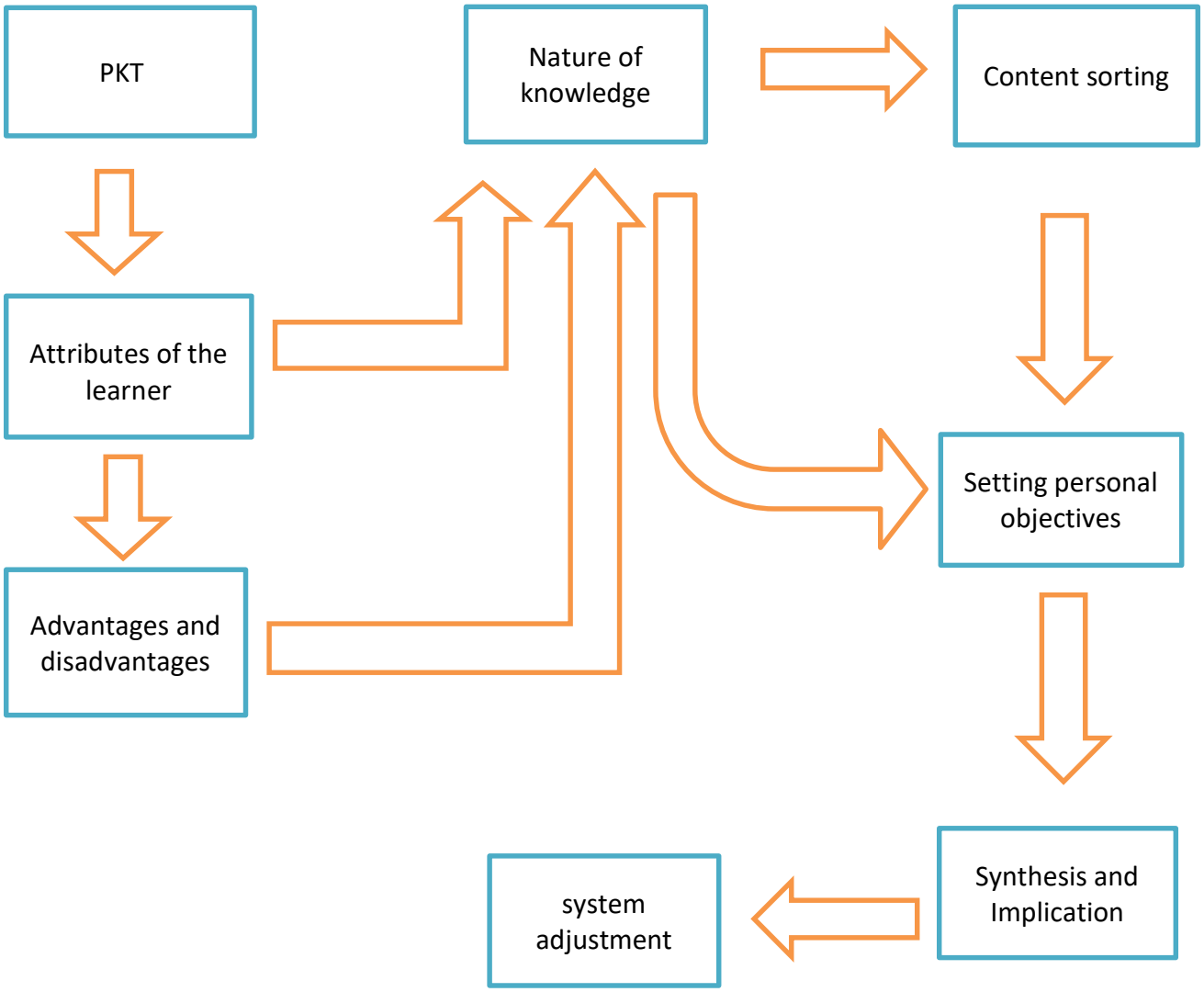

Figure 2: Design of Metacognitive Classroom Instruction

6. Discussion

A change from teacher-led to student-directed methods of fostering critical thinking is crucial given Bangladesh's increasing need for secondary education. The transition from teaching "how" to learning to figuring out "why" and "how" a person learns best is represented by this change from pedagogy to heuristics. Self-directed learning, or heuristics, gives students the ability to take charge of their education. This is especially crucial in the social sciences, where comprehending intricate societal structures and human behavior calls for more than mere memorization of facts (Hess and Kenyon, 2013).

The application of double-loop learning is a crucial part of this change. The majority of conventional classrooms use single-loop learning, in which students recognize and fix mistakes in order to accomplish a set objective. Double-loop learning, on the other hand, pushes students to challenge the underlying assumptions, values, and beliefs that initially motivated their behaviors (Argyris, 2000). In the context of social science, this means that students can consider their own prejudices or the structural causes of certain inequalities rather than just learning about social inequality. Metacognition, or the capacity to see and manage one's own cognitive processes, is fostered by this deeper level of introspection.

According to research, there is no one-size-fits-all method for developing metacognition. It entails guiding students through various awareness levels, from "silent" learners who are oblivious to their tactics to "reflective" learners who consciously modify their way of thinking (Schraw, 1998). The 2012 curriculum in Bangladesh frequently restricts this development by emphasizing rote memorization over objective-based learning. However, contemporary instructional designs, like the 8-level model, place a strong emphasis on employing confusion logs to make thinking apparent and beginning with previous knowledge tests (PKT) (NCTB 2022). Teachers serve as facilitators, assisting students in bridging the gap between "what to know" and "why to know," by incorporating various approaches (Panaoura et al., 2003).

Collaborative and open learning settings are also beneficial for the practical implementation of heutagogy in Bangladesh. Students' contextual knowledge—knowing when and where to apply particular social theories—is strengthened when they participate in project-based learning because they are compelled to discuss meaning with their peers (Spoelstra et al. 2014). This is particularly crucial in certain situations, including emergency education, where self-regulated and flexible learning can provide students the resilience they need to keep learning (Sohel, 2022).

Creating "global citizens" who are capable of independent thought should be the ultimate aim of social science education. Transform the classroom from a rigid "hardware" approach that solely adheres to a curriculum to a "software" approach that uses heuristics and double-loop learning to highlight student agency and emotional flexibility (Tyler, 2013).

7. Conclusion

In the context of Social studies , the integration of heutagogical concepts, particularly the promotion of metacognition within a double-loop learning framework, offers both potential and obstacles. The conventional educational system frequently favors pedagogy, prioritizing instructor-led learning. The changing requirements of the 21st-century workforce require a transition to learner autonomy and self-directed learning. Implementing heutagogy necessitates a culture transformation, requiring teachers to encourage rather than prescribe learning. This

will enable students to solve problems in a real-world context by ensuring experiential learning. In addition, infrastructural support, teacher training, government policy intervention, technological support, and school-society relations must be appropriately implemented to implement the heuristic approach .

Declarations

I hereby declare that this article is my original work and has not been published or submitted elsewhere for publication. All sources of information have been properly acknowledged.

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Ethical Approval
This study was granted an exemption from requiring ethics approval as it does not involve human participants or the collection of sensitive personal data. The research is based on documents, utilising secondary data exclusively from the school textbook. As such, it adheres to institutional guidelines that classify this type of study as low-risk and not subject to formal ethics approval .

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