Several Teaching Methods Combined with the Support of AI Chatbot to Develop Self-Learning Competency for Students

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ABSTRACT: Developing competency and especially self-study competency for students is one of the requirements in the 2018 General Education Program. Developing self-study competency for students is an inevitable trend of all times. , because the educational process is essentially the process of transforming the object of education (student) from an object of education into a subject of self-education. Based on the identification of three concepts: Teaching method, AI Chatbot and self-learning competency, we summarize the teaching method to develop competency and AI Chatbot. Next, illustrate the development of self-study competency for students using three teaching methods: differentiated teaching, Exploratory learning and using experiments in teaching combined with the support of AI Chatbot and from there affirms that students truly develop self-study competency.

KEYWORDS: AI Chatbot, Self-study, Self-study competency, Teaching methods, Teaching Tools, Teaching media.

INTRODUCTION

Today, under the impact of the 4.0 Industrial Revolution and increasingly deep international integration, education is required to train successors with the competency to effectively apply knowledge and understanding skills. know in life and self-study throughout life. Therefore, the 2018 General Education Program has determined the requirements to be achieved in terms of competency: The general education program forms and develops core competencies for students, which are general competencies and other skills. special force. Accordingly, the competency to be autonomous and self-learning is given top priority among general abilities. According to the Ministry of Education and Training of Vietnam (2018), "Self-study is essentially understood as brainstorming, thinking, using intellectual abilities (observing, comparing, analyzing, synthesizing...) and sometimes even muscles (use of means) and qualities, motives, emotions, outlook on life, worldview, not afraid of difficulties, afraid of suffering, perseverance, patience, passion passionate... to dominate a certain field of science, making that field their own". According to Nguyen Thi Thu Ba (2017), "Self-study skills are the competency to carry out a system of self-organized and self-controlled self-study activities on the basis of applying experiences related to activities" there. There are as many types of learning as there are types of specialized skills". The author divides self-study skills into four basic groups: 1) Orientation skills; 2) Learning planning skills; 3) Plan implementation skills; 4) Skills for self-examination, evaluation, and learning from experience.

Therefore, developing self-study competency for students is truly urgent and necessary, to help them have a spirit of self-discipline, logical thinking and lifelong self-study. To do this, teachers need to combine teaching methods to develop competency with the support of AI Chatbot to guide and support students in the self-study process by providing suggestions, direction and feedback. Providing necessary materials... helps students think, discover and acquire knowledge to achieve the lesson's objectives. Developing self-study competency for students is an inevitable trend at all times, because the educational process is essentially the process of transforming the object of education (student) from an object of education into a subject of self-education. At the same time, it helps students improve their learning results, thereby improving the quality and effectiveness of school education.

1. Some concepts
1.1. Teaching methods

Currently, there is no consensus on the concept of teaching method, but most authors "admit that teaching method has the following characteristic signs: Reflecting the movement of the process of students' knowledge to achieve the goal; Reflects the way

of information exchange between teachers and students; Reflects on how to control cognitive activities: Stimulating and building motivation, organizing cognitive activities and checking and evaluating performance results" (Phan Van Kha – Nguyen Loc, 2011)

However, if we consider teaching methods to achieve the educational goal of forming and developing learners' competency, "teaching methods are the forms and ways of working of teachers and students. in an organized teaching environment, to acquire knowledge, skills, attitudes, and develop abilities and qualities". On the other hand, teaching methods are also considered from three aspects: teaching perspectives (overall orientations for methodological actions), teaching methods (specific teaching methods, action models) and teaching techniques (ways of action of teachers and learners in small action situations to implement and adjust the teaching process) (Bernd Meier and Nguyen Van Cuong, 2014).

Therefore, teaching methods are specific teaching methods and are understood as the way teachers and students interact, in which teaching activities are the main ones (orientation, support, control). Learning activities (self-awareness, activeness, self-reflection, Exploratory and creativity) in an organized teaching environment, in order to achieve learning goals and develop students' abilities.

1.2. AI Chatbot

AI Chatbot is an intelligent chat system capable of processing human language. AI Chatbot is programmed to interact with the user like a real human and it is capable of tracking context and words in the dictionary (Wailthare, S., Gaikwad, T., Khadse, K., & Dubey , P, 2018), or it understands the user input and it responds meaningfully according to previously loaded knowledge (Kumar, R., & Ali, M. M, 2020).

AI Chatbots are widely used in people's daily lives from supporting and answering customer questions in business. In education, AI Chatbot supports students in personalizing their learners, and is a virtual teacher that supports students in learning 24/7 anytime, anywhere.

1.3. Self-study competency

According to V. A. Cruchetxki (1981) "The competency to self-study is a very important competency because self-study is the key to receiving knowledge with the modern concept of lifelong learning. Only when you have the competency to self-study can you study for a lifetime. Self-study competency includes positive, independent and creative thinking". According to Trinh Quoc Lap (2008), "Self-learning competency is demonstrated by the subject correctly determining his or her own learning motivation, being able to self-manage his or her own learning, and having a positive attitude in learning activities" activities to be able to work independently, adjust learning activities and evaluate their learning results, be able to work independently and work cooperatively with others.

According to the above viewpoints, self-learning competency is understood as the competency to self-determine and carry out learning tasks proactively and self-consciously, the competency to create internal learning motivation of learners, and the competency to think independently, think positively, independently and creatively to self-discover and acquire new knowledge effectively, solve problems in learning and apply knowledge to real life, self-regulate learning activities and Evaluate learning outcomes to achieve lifelong learning and self-study goals.

2. Teaching methods combined with the support of AI Chatbot to develop students' self-learning competency
2.1. Teaching methods develop students' competency
2.1.1. Differentiated teaching

In terms of the term "differentiation" is an activity of isolating and separating objects, to organize and determine the content, methods, means and forms to suit each object in order to realize them. perform a certain purpose to achieve the best possible effect.

According to the viewpoint of the Ministry of Education and Training of Vietnam (2018): Differentiated teaching is a teaching orientation suitable for different types of students, in order to maximize the inherent potential of each student based on different psycho-physiological characteristics, abilities, needs and interests of students. Thus, it can be understood that differentiation is expressed in distinctions based on different types of learners, applying different ways of organizing and applying content, methods and forms,... teaching activities each other, to best suit each subject, to achieve high learning efficiency.

The differentiated teaching process includes 3 steps (Do Thi Hong Minh, Do Thi Ha, 2019):

- Step 1: Classify students according to cognitive level and needs: teachers must classify students accurately. To do so, teachers need to conduct initial assessments (formal or informal) at a time close to the content of the lesson.

- Step 2: Develop and implement a differentiated teaching plan: Based on information about students' cognitive level, combined with standards of knowledge, skills, and attitudes, teachers build teaching goals for each student, select teaching content and conduct a differentiated teaching process.

- Step 3: Evaluation and summary: teachers conduct formal and informal evaluations from which to draw necessary experiences and make timely adjustments and supplements to improve the effectiveness of the process, subsequent teaching and learning.

Differentiated teaching requires teachers to have the competency, methods, psychology, and to discover the strengths and weaknesses of every student to organize differentiated teaching to limit weaknesses, promote strengths, and help Students are interested, active and achieve high results in learning.

2.1.2. Exploratory learning

Exploratory learning, introduced by Jerome Bruner in 1960, is an educational model that focuses on encouraging students to be autonomous and discover knowledge for themselves, instead of just following available instructions. One-way, students are awakened to curiosity and Exploratory by creating new knowledge for themselves from experience and existing knowledge. Students use their intuition, imagination, and creativity to find new information, to dig deeper into the facts, correlations, and truths of the subject matter. The important point here is the learner's autonomy and initiative. Students do not just sit and listen and read, but instead, they regulate their own learning process, ask their own questions, search for answers and find solutions to problems.

According to Bruner (1960, 1961), with the Exploratory learning model: Learning content is not transmitted by the teacher but independently discovered by the learner; Learners are active participants and are encouraged to ask questions and find answers; Exploratory learning, whether broad or narrow, focuses on the individual learner; Exploratory learning as a way to identify and provide structure to how individuals learn thus acts as a guiding process for educational research. Author Ozdem-Yilmaz, Y., & Bilican, K. (2020), Exploratory learning is a learning method in which students are encouraged to discover information and knowledge for themselves through practical experiences. This method is based on the notion that students learn best when they are allowed to explore and experience the world around them. Author Castronova (2002), compared self-Exploratory learning with traditional learning methods and argued that self-Exploratory learning is more effective in the 21st century. This author argues that self-Exploratory learning can help students develop the skills needed to succeed in the 21st century, such as: critical thinking, problem solving, teamwork, creativity, flexibility. Castronova also believes that self-Exploratory learning can help students become more active and engaged in the learning process. When students are allowed to discover information on their own, they are more likely to feel interested and engaged in the lesson.

According to researchers, Exploratory learning has the following characteristics: First, Exploratory learning is active learning, the learner is an active participant in the learning process, not a one-way absorber of words. teacher side. Second, this is a meaningful learning model because it takes advantage of students' own associations as the basis of understanding. Finally, Exploratory learning helps change beliefs and attitudes, placing more responsibility for learning on the learner. Students often have to apply thinking processes to solve problems and discover things to learn, so they must take more responsibility for their own learning (Svinicki, M. D, 1998).

2.1.3. Using experiments in teaching

Teaching through experiments is a teaching method in which teachers use experiments or hands-on activities to create an interactive and exciting learning experience for students. This method encourages students to engage in exploration, observation, data collection, and drawing conclusions from experiments or experimental activities. Using experiments in teaching helps students understand and apply knowledge intuitively and practically. It encourages scientific thinking, develops observation, analysis and reasoning skills. Through experimentation, students can explore and discover principles and rules, determine relationships between factors, and test hypotheses (McComas, W. F. 2006), (Hofstein, A., & Lunetta, V. N, 2004).

Virtual experiments (Gilakjani, A. P., & Ahmadi, S. M., 2011), (Huang, W. H., & Somanath, S., 2013) are a type of experiment performed through a virtual environment or simulation software, instead of in real environment. Virtual experiments allow students to perform experimental activities, interact with elements, and observe phenomena in virtual space. Using video experiments (Basque, J., Elliott, R., & Stieff, M., 2018), (Nentwig, P., & Moeri, S., 2016) is a method in teaching that experiments

Experiments are performed in the laboratory and recorded as video. Instead of performing it in person, students can watch and analyze experiments through videos to understand and explore scientific phenomena. Using video experiments has several benefits:
- Intuitive and vivid: Video allows students to directly watch the experiment process and observe the phenomena taking place vividly. This helps students gain a deeper understanding of experimental concepts and procedures.
- Repeat-competency: With videos, students can watch them multiple times to better understand the steps and results of the experiment. This helps students improve their technical observation and analysis abilities.
- Save time and resources: Instead of performing experiments directly, using videos allows saving time and resources. Teachers can choose quality and suitable experimental videos to use in the teaching process.

2.2 Develop self-study competency through teaching and competency development methods combined with the support of AI Chatbot

According to Nguyen Minh Giam and colleagues (2023), the teaching model uses AI Chatbot as a virtual teacher to support the self-study process for students 24/7. With the characteristics of this teaching model, students can use AI Chatbot before class, during class and after class:

+ Use before class: AI Chatbot will support students in self-studying and researching lessons at home. This self-study activity will help students: Self-study and research basic knowledge and background knowledge; Self-observe the experimental content and explain the experimental phenomena; Self-study exercises from basic to advanced; Test your knowledge and self-study skills.

+ Use during class: With the support of AI Chatbot, teachers are the ones who assign tasks and orient and support students' learning with knowledge related to the lesson before learning the official lesson in class to Students study and research on their own. Steps to use AI Chatbot in class: (1) teachers guide students to self-study with AI Chatbot; (2) students practice with AI Chatbot; (3) Support: teachers are observers and support students through admin rights; (4) Summary: the teacher summarizes the learning process, summarizes the main content that students need to know, understand and remember in the lesson; 5) Assigning lessons: teachers remind students to re-study today's lesson, ask and interact with Chatbot about more detailed and in-depth content.

+ Use after class: The self-study process after class is the process of students reviewing and consolidating and testing their knowledge and learning skills after studying in class. Students do the exercises assigned by teachers and research and discover new knowledge with AI Chatbot. With this form, the author proposes self-study steps like in the form of self-study before going to class.

Based on the theoretical framework of teaching methods to develop competency combined with the support of AI Chabot, we illustrate the development of self-study competency for students as follows:

Table 1. Develop self-study capacity for students with the support of AI Chatbot based on Capacity Development teaching methods

Teaching methods to develop competency	The support of AI Chatbot
Differentiated teaching	- Step 1: Classify each student accurately. First, AI Chatbot will perform tests and evaluate students through the lesson content to collect data related to student awareness. - Step 2: Based on information about the student's cognitive level, AI Chatbot suggests and provides appropriate knowledge for each student in a differentiated manner. - Step 3: AI Chatbot conducts tests and evaluates content related to the content of the lesson. If the student passes the test questions, he or she completes the lesson. If the student has not passed any test questions, the AI Chatbot will provide and suggest relevant content for the student to restudy and retake the test questions. Check until it's right. Differentiated teaching is a teaching strategy based on the teacher's awareness and assessment of the needs, abilities and interests of each individual learner, thereby detecting and compensating for knowledge gaps. On this basis, teachers shape and

	build AI Chatbot scenarios with appropriate teaching content towards building a new learning environment so that all students can participate, understand lessons and receive 24/7 support. 7. Therefore, students create their own need to learn, desire to understand, passion and desire to progress in learning.
Exploratory learning	Exploratory learning has many advantages such as encouraging motivation and active participation; adjust to the learner's pace; promotes autonomy and independence and helps students remember longer, thereby making learning more enjoyable. AI Chatbot loaded with data and trained through natural language will respond immediately and 24/7 in a personalized way that will help learners interact, encouraging students to become autonomous, capable people. Creativity and competency to learn new knowledge through self-Exploratory of knowledge and proactive grasp in the learning process. This is a manifestation of the development of self-study competency for students.
Using experiments in teaching	During the experiment class, AI Chatbot provides virtual experiment content through videos and images combined with text in the AI Chatbot's script over and over again to help students gain knowledge, Explain natural, physical, and chemical phenomena and apply them to solve real-life problems. Students can ask any questions related to the experimental content and the AI Chatbot will answer and explain 24/7. This means students are developing their own self-study competency.

3. Conclusion

The strong and comprehensive impact of the 4.0 Industrial Revolution on education and training in the world in general and in Vietnam in particular has been bringing about significant educational effectiveness. Teachers can apply appropriate teaching methods combined with the support of AI Chatbot to develop competency, especially self-study competency for students. Through three teaching methods: differentiated teaching, Exploratory learning and using experiments in teaching combined with the support of AI Chatbot illustrated in section 2.2. has proven that students can truly develop their self-study competency. Students create their own internal motivation to learn, become autonomous, creative and able to learn new knowledge through self-Exploratory of knowledge and active grasp in the learning process. practice. At the same time, students collect new knowledge and apply it to solve real-life problems. Therefore, teachers need to choose and apply appropriate teaching methods combined with AI Chatbot support so that students fully absorb the content and achieve the goal of lifelong learning and teaching.

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