ANALYSIS OF INSTRUCTION MODELS IN SMART EDUCATION

JaeHyeong Park, JeongWon Choi and YoungJun Lee
Korea National University of Education
Chungbuk, Korea

ABSTRACT

Development in the smartifacts and wireless network has brought changes in the approaches and usages, as well as producing and sharing of the information. The learners are changing into independent provider from consumer of information. In order to teach the students effectively with this trend, changes in the education is inevitable. In Korea, SMART education has been implemented to fit into the trend. SMART education can be understood as the change in the paradigm which grafts newly developed technologies onto education to meet the changes and the developments in the school systems. There are various instruction models for ideal education in the changed academic environment. This research analyzed the SMART education used in Korea, and suggests that there is a need for further research on the instruction models.

KEYWORDS

Smart Education, Instruction Model.

1. INTRODUCTION

Development in the twenty-first century high technologies and information technologies has a great effect on the educational system today. Especially, the development of smartifacts connected to the mobiles, the ubiquitous learning environment has been established for learning, unlimited of time and place. Also the strong networking function which allows collaboration allowed the various activities such as participation and sharing. With these functions, the students gained the choices over various forms of educational data and information; they are becoming independent information providers. Also the instructors now hold a combined role as enforced facilitator and coordinator who operates and choose the information technologies. These changed in the paradigms of educations need new instruction models. Therefore, this research examined SMART instruction models and offers directions for further developments.

2. SMART EDUCATION

2.1 Definition and Characteristic of SMART Education

The definition of SMART education ranges from microscopic perspective to macroscopic perspectives depending on the scholars; education that uses smart technologies to change in the paradigm of education for the future. However, the definition of SMART education proposed by the Ministry of Education, Science and Technology (2011) is explained in terms of more macroscopic perspectives; its purpose of overall changes in the education systems. In the other words, it is defined "SMART learning is an intelligent, tailored instruction-learning supporting system, in which the demands of the 21st century information technology society are met with changes in the overall education system such as pedagogy, curriculum, assessment, and teacher. It is a combination of human centered social learning and adaptive learning, based on the best network communication environment." The Ministry of Education, Science, and Technology explains the SMART education with its acronym (Table 1).

Table 1. Characteristic of Smart Education

Initial	Feature	Details
S(Self-directed)	Knowledge manufacturer	Change in the role of the student from the consumer to the provider, role of the instructor from the knowledge messenger to the educational mentor
	Intelligent	A self-conducted learning system with online achievement evaluation and prescription
M(Motivated)	Experience-centered	Emphasize on the experience-centered learning method in the standardized textbook based education
	Problem Solving	Aim for creative problem solving and the process-based individualized evaluation
A(Adaptive)	Flexibility	Enforced flexibility of the education system and personalized learning experience based on the preferences or future careers
	Individualizatio n	Role of school changes from delivering mass knowledge to providing individualized learning with regards to the level and the aptitude of the student
R(Resource-free)	Open Market	Based on the Cloud educational service, various contents developed by the publics, privates and individuals are applied to the education
	Social Networking	Expansion of collaborative learning using domestic and oversea learning resources using collective intelligence and social learning
T(Technology embedded)	Open Education	An open environment that offers desired learning experience regardless of time and place, and also guarantees maximum learning options with various education

2.2 Purpose and Aim of SMART Education

The aim of SMART education is to cultivate the individuals into the future global leaders using the information technologies to prepare the students with characteristics and abilities of twenty-first century. In order to achieve its aim, a total of 5 different practical assignments stimulate SMART education. Firstly, in the educational contents, a step-wise expansion of digital text book is pushed forward for effective learning of students and educational support of the instructors. Secondly, in the educational methods, the student's learning experiences regardless of the geographical difficulties are enforced through active online courses. Thirdly, in the educational environment, it creates safe donation and sharing of education contents. Fourthly, in the capability of the facilitators, it offers various training opportunities and programs for the facilitators to strengthen the instructing abilities for the SMART education. Lastly, in the foundation aspects, Cloud education service environment is achieved for easy and unlimited access to the educational contents for the instructors and students.

3. EXAMPLES AND ANALYSIS OF SMART COURSES

3.1 Smart Instruction Model

3.1.1 Idea Sharing Instruction Model

'Idea Sharing' instruction model is a class model in which the students first independently think about the proposed problem then shares the ideas with fellow classmates and the instructor using the smartifacts to examine and reshape the solutions. This instruction model is listed step-wise in Table 2

Table 2. Idea Sharing Instruction model

Steps	Activities
Come up with Ideas	Form individual ideas, write down the ideas, finalize the ideas to be shared with class
Sharing Ideas	Save and share the ideas, examine ideas
Combining Ideas	Complement individual ideas, confirm the changes

Looking at the detailed steps of the instruction, the first "come up with ideas" step is a prior knowledge based brainstorming step which requires the students to come up with and express individual ideas. The second step, "Sharing Ideas", focuses on the main activity of sharing, saving, and examining the ideas (such as concepts, processes, opinions, etc.) with everyone else on the network. Finally, "Combining Ideas" step offers the opportunities to examine other individuals' ideas and complementing one's own ideas, as well as extra information searching opportunities if needed.

3.1.2 Research Activities Centered Instruction Model

'Research Activities Centered' instruction model is based on the research activities in which problem is solved through following steps; gathering information on the internet or database, critical analysis, and rational decision making. The step-wise instruction model is shown in Table 3.

Table 3. Research Activities Centered Instruction Model

Steps	Activities
Planning	Create a question relative to the search (or provided by the instructor), Consider how to conduct the investigation
Search and Gathering	Collect the information by searching the internet or database, confirm the credibility of the information/data, sort and analyze collected information
Presentation	Present the results, give feedback, and reflect

Looking into the detailed instruction steps, the first "Planning" step heavily weighs creating a relative question to the research topic in order to decide what to search for. The second step, "Search and Gathering", is a step in which information credibility is decided upon searching the internet and the database, and collected information/data is sorted and analyzed accordingly. In the last step, "Presentation," a simple, to-the-point, accurate presentation that answers the research topic prepared by the instructor is required.

3.1.3 SMART Activity Based Instruction Model

SMART activity based Instruction Model is not limited to the details of the previous instruction models; it is based on the various SMART activities that can expedite the capabilities of the 21 century students. The detailed instruction model is shown in Table 4.

Table 4. SMART activity based Instruction Model

Steps	Activities
Introduction	Have a critical mind, problem deduction
Activities	SMART activities using various academic supporting equipment to expedite the 21 century academic capabilities
Conclusion	Feedback and Evaluation on the activities, formative evaluation on the academic activities

In the "Activities" step, following SMART activities are implemented to accelerate the capabilities of 21 century learning. (Table 5)

Table 5. SMART activity and Use of Supplementary Equipment

Activities	Use of Supplementary Equipment
Collaboration	Writing a scenario or group report using Google Drive Presentation after group work using Prezi
Communication	Sharing opinions, and rewriting through SNS(Twitter, Facebook) Group discussion and Instructor consultations using Google Hang-out
Thinking	Reconstitution of the data using one-note, ever-note Drawing mind map using x-mind
Creativity	Brain Writing using Sticky Producing creative animations using StopMotion, Animating Touch
Research and Experience	Research activities using the map and measurement apps

3.1.4 Analysis of SMART Instruction Model

First, the 'Idea Sharing' instruction model aims to provide activities such as participation and sharing using the smartifacts. However, these activities are available with previous classroom environment through presentations or discussions. On the other hand, there is a risk of creating a 'quiet classroom' with the use of smartifacts. Therefore, 'Idea Sharing' instruction model can be further improved by having the students to prepare to share the newly gained knowledge or ideas in the class for the following class period.

Secondly, 'Research activity centered' instruction model has merit of searching and using the information real time. However, it depends more on the internet and database search rather than on the students' critical thinking development; also time can be wasted focusing on putting presentation together using the computer, rather than being spent on the academic contents. Therefore, it is important to secure enough time to analyze and communicate the gathered information and spend less time on the search and gathering.

Thirdly, 'SMART activity centered' instruction model allows the students to present the results in various forms such as group report and animation, which was harder to do in previous classroom environments. However, when the focus is on the activities, the students may be distracted using the applications causing less academic achievement. Therefore, it is important to induce the students to have more interest in the academic evaluation or feedbacks rather than in the activities.

4. CONCLUSION AND RECOMMENDATION

SMART education can be seen as the change in the paradigm which brings in the smartifacts of the twenty-first century digital media environment to offer activities such as search, sharing, communication and application to improve classroom experiences. Various instruction models are being developed with SMART education introduced, and analyzing this trend, it was found that SMART education allowed various real time data search, communication, and presentation to be possible; with previous instruction models, such activities were not easily granted. However, if the spotlight is on the usage of smartifacts in the activities, the SMART education will not be practical. Therefore, there is a need for continuous research on the instruction models to increase the students' capabilities and better class instruction methods. Clearly indicate advantages, limitations and possible applications.

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