Review Article

A short review on cooperative aspects of learning in distance education

Abstract

For a long period of time, stretching back to the beginning of experimental broadband backbone networks, research members have conducted studies to explore and develop cooperative aspects of learning in distance education. So far, many kinds of R&D results from typical case studies have been published and demonstrated in domestic or international public areas.

As compared with the other educational environments (e.g. electronic media-based, satellite-based systems, up to metaverse-based, chat-AI based systems etc.), interactive communications in a true sense should have been noted here for individually better educational situations and more agile business modeling under the information environments on a high speed and widespread network with intelligent electronic media.

Takao Ichiko

Department of Informatics, Faculty of Engineering, Yamagata National University, Japan

Correspondence: Takao Ichiko, Department of Informatics, Faculty of Engineering, Yamagata National University, Japan (to be retired) 1-18-3 Asahigaoka, Hanamigawa-ku, Chiba City, Chiba Prefecture 2620019, Japan, Tel +81 o43 296 0070, Email t.ichiko15@jcom.zaq.ne.jp

Introduction

Generally speaking, an interactive communications environment often simply means a bidirectional communications one with the difficulties of highly intentional communications even on a real-time basis, which could have been realized in a historical education system such as *"terakoya"* in Japan. Thus far, the issues and matters have been discussed for possible solutions in published papers and open lectures or seminars. As an example, one of the remarkable case studies has been extended with an introduction of mobile terminals into distance educational situations.[1,2] for better understanding. This introduction can help the situations take a turn for the better. It should be noted in particular that two points are included here. One is a more scaled reduction of server overheads (cf. application service providers). Another is a more effective and flexible formation of local communities.

Electronic media and its impacts on educational to social communications in information technology

Recently, typical events have been found to occur in educational sites from elementary to higher public educational institutions. As compared with the conventional ones, they have changed remarkably in number and quality so far with the advancement of information technology (IT), even if they are at more unbalanced stages in their situations. As a result, for instance, people all over the world are globally or locally influenced by each other from a widespread range of politics, economics, business, education, and culture, to social, regional, personal and so on. According to the research context, IT basic impacts on educational and social environments are reviewed to suggest the following:

IT Basic impacts on educational and social environments

➢ From humans or material mobility in the real world to "abstract mobility" based on information mapping; ex. human behaviors and activities are becoming more timely, and then can be amplified and extended on an intelligent and/or physical capability basis.

➢ "Information cost" to be remarkably reduced; ex. anyone can attend more cooperative works on the reconstruction of information environments not only on larger scales or bigger capital bases.

➢ "Information productivity" to possibly be revolved and increased both on individual and organizational sites; ex. economic trends, both investments and consumptions, can be greatly influenced and changed.

➢ "Information transitional states and phases" to be very widely affected in personal, group and mass communities; ex. mutual relationships between each other such as instructor-students, enterprise-customers and so on have been changed at large. Then even middle layers can be merged into any situation, at the same time with newly produced coordination.

➢ The sovereign powers in any region to be greatly shifted or distributed for "information initiatives"; ex. reciprocal dynamics can be changed at large, and terminal users or beneficiaries can be predominant over the predecessors.

➢ Widely "integrated intelligence and know-how" can be more readily available from local to public connections in any information environment; ex. open policies and concepts can be more advantageous than closed ones, including confidence.

➢ Newly expressive "electronic media tools" and activity manners and/or styles to be developed and diffused on the basis of viewpoints and value-added theories; ex. traditional family-based units to social structures may be more adaptive for the next generation phase.

➢ Conventionally "deep-rooted constraints", including space-time dimensional factors to be easily overcome and more controllable ; ex. many kinds of handicapped matters can also be easily overcome and gradually integrated to create a new worth based on value-added theories and principles, or sometimes merit-demerit situations, strength-weakness and so on can be reversed.

➢ The introduction of intelligence through electronic media has allowed for exploration of "more multi dimensions and higher quality principles" beyond one-dimensional utilitarianism. For example, with deeper knowledge and higher intelligence based on contexts with compatible rules and applicability, the concept of QOL (quality of life) can be pursued both in the real world and virtual space.

➢ Having a basic understanding of "media literacy" is crucial for effectively processing information and is essential to achieving

an affluent lifestyle with higher quality of life. Examples of fundamental literacies, including classical abacus based-literacy, computer literacy, network literacy and new media literacy can be considered as some of the most important basics of ordinary life.

Conceptual approaches for the situations in the research

Under these considerations, several typical research studies have been undertaken, as shown in the author's related references.[1–4] Fundamental communications in education are also to be argued, which are quite similar to those in a general meeting or conference. It can be suggested that one of the bigger differences between them has been the inclusion of more qualitative items with more weighted values from the view points of cost and quality in education.

What is education defined as, up to now? How does one learn? And moreover, how can it be specified more precisely, referring to B.S.Bloom's famous remarks? Traditionally speaking, it can also be imagined to suggest one of the *prefetched* society solutions in the near future. On the other hand, it can also be pointed out as an example from the author's R&D that education should be conducted and situated at the maximum stage from pedagogy, economics, technology, and culture, up to personal value-added contents. The discussions have proceeded to exploit an advanced version case study to be extended from the author's conventional distance educational R&D. These case studies aim to realize more adaptive and real-time communications under the educational situations with an introduction of personal mobile terminals (e.g. mobile phones, tablet/note PC, other image / sound / textual terminals and so forth) on the information network environments. In the research context, two possibly important phases are mentioned to this effect, that is, one is for lectures or seminars in education, and the other is for electronic text books (e-books).[4–6] In particular, this review mainly concentrates on previous R&D results. It is important to emphasize that R&D has been conducted during the previous phase to improve the quality communication based on contexts, while minimizing mutual disturbance to an individual's mental or behavioral processes under any circumstances. This includes typical features such as instantaneousness, portability, physicality, integrity and reality, which are important for unwired real-time communications. Pedagogically speaking, with the introduction of mobile terminals, higher real time communications have been cultivated more widely and in-depth even under cultural situations here.[7] It would be more desirable to educate student learners' communication ability for cognitive, affective or psycho-motored dialogues with better communication skills. In general lectures or seminars, teaching staff can recognize the questions by the student's intention or behaviors, and begin to communicate humanly between each other during the process. It is more important that the questions range in a wide and in-depth space, and that more severe mismatches are able to occur there if the present educational situations remain unchanged both by each and in total. Here, it can be especially aimed to find a more realistic solution for the problems and issues in an educational lecture room community by way of mobile terminals buffered in the current version between teaching staff and students, and additionally among students, according to the research context.

Up to higher education, general domain knowledge of the students may be less or more narrow than that of the teaching staff both in general and in specialty. For instance, there may be quite a few students who are unable to recognize it at first in the lectures or seminars and also to extend a new concept within possible time and space dimensions. Therefore, as an effort in the R&D, it was notable to be able to share individual domain knowledge space developed during one of the conceptual processes, and to integrate a shared space in education, which leads to more widely or more deeply smooth transitions from recognition and acceptance to the next conceptual developments.

At the same time, it can be extended to dynamically prepare for various kinds of communication channels, not only in a powerful one-directional space, but also in the reverse one between teaching staff and students,and moreover, even in the bi-directional one among individual students.

For example;

- backbone collaborative functionality for mobile terminals

- domain knowledge/intelligence, in-depth space to its maturity

- newly educational interactions and developments

- functionally and intelligently rich extensions in place of mobile terminals

Under the circumstances, it will more feasibly exploit open-ended lectures or seminars derived not only from teaching staffs' domain knowledge/intelligence sources, but also from any social kinds of sources on a connected information network. It should be noted that an introduction of mobile terminals means not only efficient real-time communications among teaching staff and students, but also more possibly widespread lecture or seminar performance in daily social life.

Next, a prototype system is discussed according to the R&D concept. For a general example, such mobile terminals as mobile phones, which have become more advanced and diffused here as compared with other areas of the world (e.g. cooperatively expressed classical "Haiku"/"Renga" on a mobile network), can be used solely in the forms of voice or e-mail at peer to peer. However, it can be aimed to intentionally communicate and especially to reconfirm in sharing multiple media information by making the most use of browser software on mobile phones so as to mutually recognize knowledge information and acquire knowledge under the more serious situations.

The main specifications are as follows:

- To transfer or reconfirm informational data in hypertext pages visible by mobile phones and at desktop PCs

- To make use of selectional options and text inputs

- To make web pages display at some terminals on a real-time basis

The system is featured in the research as follows:

i) To mutually send or reconfirm individual intentions on clients' mobile phones

ii) To display log data for the teaching staff on a real-time basis so as to confirm not only mass intentions, but also individual intentions for better solutions depending on the current educational situations

iii) To extend a conceptual process for interactive communications and confirmation among students

iv) To make the most use of individual solutions referring to data log in the past

Finally, the detailed practical situations will be pursued, which is extended in an educational environment for cooperative aspects of high quality learning with high-end real-time communications. This means to be able to transfer the state positions of individuals

to more integrated group or mass communities into the servers' site (including teaching staff as well) under the necessarily educational situations, and as a result, it becomes more realistic for more situated guidance and orientation toward a new direction for more intentional communications and more flexible interactions.

Acknowledgements

Conflicts of interests

Author declares that there is no conflict of interest.

References

1. Ichiko T. *A core leading scheme in more deeply cooperative learning with a mobile focus*. ASEE Annual Conference(USA); 2018.

2. Ichiko T, Yamamoto M, Kawamura Y, Hanano M. Advanced multimedia telecommunications using a high speed broadband backbone network beyond all aspects of the current internet (Revised). *Computers & Education*. 2001;37(3):211–224.

3. Ichiko T. *Cooperative aspects of learning with an assessment concept scheme through intentional communications extended for distance learning*. Annual Conference of the International Council for Educational Media (ICEM 2022): Santarém Portugal; 2022.

4. Ichiko T. Conceptual Software in Hypermedia Environment-Cooperative Learning in Electronic Distance Education. In Willis J, Price J, McNeil S, Robin B & Willis D (Eds.), Proceedings of SITE 1997--Society for Information Technology & Teacher Education International Conference. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE); 1997: 885–888.

5. *Merlot; A Program of the California State University*; 1997.

6. Kurozumi T, Ichiko T. Targets and results from phase one and two of the fifth generation computer systems study. *Future Generation Computer Systems*. 1989;4(4):307–325.

7. Itakura K. *A hypotheses-based experimental class*. Trans Pacific Press; 1963.