

Analysis of the current situation of remote interaction

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Abstract: With the rapid development and popularity of network technology and information-based education in recent years, distance learning methods have gradually entered the research fields of educational scholars in different countries. With regard to the interaction problems in the process of distance learning, the current situation and classification of distance learning, the content of interaction in distance learning and interaction in different learning environments are studied, and the current development status and problems of distance interaction are summarized and analyzed.

Keywords: Teaching Interaction; Remote Interaction; Distance Education

1. Introduction

Online education, as an auxiliary means of offline education, has promoted the development of distance education, expanded the scope of teaching, solved some of the problems of insufficient educational resources, and made teaching more flexible [1]. With the development and application of network technology, different styles of teaching systems and teaching platforms have been established on the Internet, and these systems and platforms have greatly advanced the development of interactive systems for online teaching. Compared with traditional teaching, modern distance learning environment not only allows learners to share rich information resources, but also enables them to use the network to exchange information, break through the geographical and time constraints, and to filter information, explore and integrate knowledge according to their needs, so as to form their own construction of meaning [2]. Since interaction has an important role in education, it is important to analyze the current state of research and problems of distance interaction to guide learners in choosing appropriate strategies and improving learning efficiency.

2. Concept Definition

2.1. Distance education

Different domestic and foreign scholars have presented their views on the definition of distance education. McMoore defined distance learning as a collection of some teaching methods, while Peterswine considered distance learning or distance education as a method of transferring knowledge, skills attitudes [3]. In the 1980s, the Irish scholar Keegan synthesized and analyzed the views of other scholars to propose a descriptive definition of distance education, containing the separation of teacher and student, the influence of educational organizations, the application of technological media, two-way communication mechanisms, and the possibility of The five elements of face-to-face communication have gained worldwide recognition. The Chinese scholar Ding Xingfu gave five descriptive definitions of distance education based on the practical characteristics of correspondence and radio and television education in China: separation of students and teachers in time and space, dominance of media teaching based on modern educational technology, organized system engineering, self-learning as the main aid, and the existence of some form of two-way communication and feedback mechanism between students and teachers [4]. Ding Xingfu's definition and characterization of distance education is widely accepted in Chinese distance education research, and this paper adopts the definition.

2.2. Teaching interaction

Interaction is a concept with very rich connotations, and the teaching interaction mentioned in this

study mainly refers to the teaching interaction in the distance education context, which can be described as a two-way communication process between an individual and the system or others to complete a learning task or establish social relationships in the network environment [5]. The comprehensive definition of related concepts shows that the definition of instructional interaction tends to be universal, and it is no longer bound to a certain learning theory; the occurrence of instructional interaction is no longer just a single binary communication and role between people, but should be the communication and role between the triad of people, resources, and environment, and the occurrence of instructional interaction is no longer a single, one-sided environment, whether it is a face-to-face classroom, an online classroom, or a blended learning. Whether it is a face-to-face classroom, an online classroom, or a blended learning classroom environment, the environment in which instructional interactions exist has taken on complexity [6].

3. Classification of distance learning interactions

Currently, many scholars at home and abroad have discussed the classification of interactions in the teaching and learning domain from different perspectives, and although the classification perspectives are different, most of them are from the classification frameworks of learner-learner interaction, learner-teacher interaction and learner. The classification framework of learner-learner interaction, learner-teacher interaction and learner-content interaction has been discussed [7]. Based on this classification framework, combined with the characteristics of interactions in current online open courses and the current application of interaction design, this study combines learner-learner interactions and learner-instructor interactions into interpersonal interactions, and learner-content interaction and the interaction between other learners and learning resources are classified as human-computer interaction, while for the emotional interaction missing in the above classification, this study classifies the interactive content in distance learning into three categories: interpersonal interaction, human-computer interaction and emotional interaction.

Meanwhile, with the rapid development and popularity of network technology and information-based education in recent years, different types of learning interactions in distance learning environments have gradually entered the research fields of educational scholars, such as online learning environments, collaborative learning environments and virtual learning environments, and many results have been achieved, and the forms of interactions have become increasingly diversified.

4. Interactive content analysis in distance learning

4.1. *Person to person interaction*

From the viewpoint of the object of interaction, the interaction in online courses can be divided into two kinds, the first one is interpersonal interaction, that is, the interaction between learners and teachers or experts, and between learners and learners, and this interaction can be real-time or non-real-time.

The technology and strategy of video interactive learning has changed the nature of the previous one-way and linear flow of teaching video information, and the knowledge construction presents networked characteristics, which makes up for the shortcomings of the open course video classroom. In terms of learner-learner interaction, it can be carried out through personalized classroom sharing and collaboration, topic seminars based on knowledge points and video clips, and in the video course, synchronous or asynchronous communication between users can be realized through "interaction for all", which provides learners with the opportunity to gain new perspectives and pass the cooperation, and quizzes and feedback functions are added to the teaching videos. Feedback functions are added to the videos. In terms of learner-teacher interaction, the precise recording of learners' behavior at the point of time and knowledge in the personalized classroom helps teachers understand the characteristics of different groups of learners, reflect on and improve their own teaching, and ultimately reflect them in the video classroom [8].

In general, there are two main types of communication between students: one is discussion-based interaction and the other is pop-up-based interaction. The former exists in video courses such as "China University MOOC", "NetEase Cloud Classroom", and "NetEase Open Class", where the discussion area is usually located on the right side of the video course and learners can discuss. To a certain extent, this provides a way for learners who are studying the same course content to communicate with each other. The latter exists in some online teaching or live teaching, where learners can participate in

discussions while watching live courses, enabling real-time communication: but when learners watch recorded courses, they are not easily able to get timely responses to questions and topics raised due to the free viewing time.

4.2. Man-machine interaction

The second type of interaction is human-computer interaction, i.e., the interaction between learners and learning materials, and between learners and teaching software. The methods and means of human-computer interaction are flexible and highly creative, and its quality will be inseparable from the creativity and technical skills of the designer. "Unlike "human-computer interaction", which is somewhat fixed, it does not have a fixed pattern and can be designed in an arbitrary way, with the support of many software systems or interaction methods. In addition, some of the interactions using emotion analysis and recognition technology also have human-computer interactions, which will be categorized as emotional interactions for detailed analysis.

The resource interaction in video interactive learning can set up personalized video classrooms, where structured teaching videos logically exist as knowledge point-based clips, while using the logic slicing function, learners and teachers can select custom clips from the original video and give descriptions such as titles and keywords to the clips. These segments can be retrieved, sorted, and even reorganized in a sequence to form a new video classroom^[8]. When learners watch an online video course, they can interact with the learning content not only by clicking on the video, but also by adding comments, notes, annotations, and viewing supplementary resources and extensions.

4.3. Emotional Interaction

Emotional interaction is an inner experience of interconnection between learners and teachers as well as learners, which mainly refers to the mutual emotional tendency and satisfaction with the current situation of the interaction between the two parties, manifested as mutual attachment, psychological empathy, mutual understanding, emotional experience, etc., resulting in the emotional component of mutual trust and dependence, which is conducive to improving learners' motivation for sustainable learning^[9].

In the study of emotional interaction in the process of distance education, we usually make use of some scientific tools, such as the "Intelligent Learning Companion" system, and we can make detailed emotional design of the "Intelligent Learning Companion" in the overall emotional design, for example, learners first pay attention to their mood state after logging in. For example, learners first pay attention to their mood state after logging in, so as to understand the emotional state of learners at this time, and thus we can also understand the influence of emotions on learners' efficiency in community learning from the mood state. In addition, the "Smart Learning Companion" is designed for emotional interaction from greeting, warm reminder and relaxation respectively. The emotional interactions are designed through the reminder, greeting, and guidance functions to guide the learners' emotions and make them feel a sense of belonging in the learning process^[10].

Human-computer interaction can also be designed and applied using affective computing techniques, which is a highly integrated technical field. By combining affective computing with psychological and cognitive sciences, studying the emotional characteristics of human-human interaction and human-computer interaction processes, and designing human-computer interaction environments with emotional feedback, it will be possible to achieve emotional human-computer interaction. So far, relevant research has made some progress in facial expression analysis, gesture analysis, and linguistic emotion recognition and expression. Emotional computing research will continue to deepen the understanding of human emotional states and mechanisms, and improve the harmony of human-computer interface and human-computer interaction, i.e., improve the ability of computers to perceive situations, understand human emotions and intentions, and respond appropriately.

5. Interaction analysis in different learning environments

5.1. Interactive analysis in an online learning environment

With the development of modern information technology, various forms of online learning methods have emerged, and research based on online learning has covered almost every aspect of the field. As a modern learning method based on rich learning resources and flexible forms, the design and

development of effective learning interactions have always been the core of practice and research in this field. Currently, the interaction activities in the online learning process are mainly designed from two aspects: interpersonal interaction and resource interaction.

Interpersonal interaction in teaching refers to the communication and exchange between teachers and students, and between students and students, and this interaction should not be limited to the classroom, but using some modular dynamic learning platforms or learning environments, such as Moodle, can provide learners with rich interaction opportunities. Based on these platforms an interpersonal interaction field can be constructed, where teachers can provide individualized instruction to learners or learners can consult with teachers, or learners can learn and discuss and communicate with each other, and it supports various learning modes such as collaborative learning, discussion learning, and inquiry learning^[11]. Online discussion forums and chat rooms are mainly used in many online open courses to achieve synchronous communication between people in online learning. At the same time, asynchronous communication such as emails, forums, and Q&A areas are also used so that learners can discuss and communicate with other learners and instructors according to their own learning needs^[7].

No matter how varied the forms of online learning resources are, their "educational" nature is always a fundamental feature that cannot be denied. The main feature is the interaction between learners and learning resources. In the design of online learning resource interaction, the design is mostly based on the principles of integrated design, limited interaction and channel balance^[12].

5.2. Interactive analysis in collaborative learning environments

Collaborative online course interaction specifically refers to the instructional interaction in collaborative online courses, which refers to the interaction between learners and other elements in the online learning environment.

The four main presences in collaborative online learning are emotional interaction, social interaction, cognitive interaction, and instructional interaction. Emotional interaction refers to the process of online learners' conscious emotional exchange and communication with each other around the learning content in order to achieve the learning goals and thus achieve empathy. Social presence refers to the ability of online learners to demonstrate their personal characteristics as "real people" in the community, including both social and emotional aspects. Cognitive presence refers to the extent to which online learners construct meaning through ongoing communication and includes four aspects: triggering events, exploration, integration, and resolution. Instructional presence refers to the process of designing, facilitating, and directing in order to achieve personally meaningful and educationally valuable learning outcomes, and according to this meaning, instructional interactions can be classified into three categories: design organization, facilitation of interactions, and direct instruction, with the aim of facilitating the development of mutual coordination among various presences, whose role is to monitor the process of tasks and facilitate their smooth execution^[13].

The designer of interaction design in a collaborative learning environment must pay attention to observing the actual existing interactions and problem solving among students individually or in groups, between individuals and groups, and between people and interfaces, to understand and grasp what learners are actually doing in the e-collaborative learning environment. The designer should get to know the cultural practices existing in the learners, the learning environment, and other relevant factors that constrain the learners' learning. It is also important to understand how learners should perceive and to understand the support technologies available for the experience and how learners have used them. The designer gives the learner the design and provides support for improvement, as well as understanding and evaluating the final feedback on what the learner has learned, and then making improvements to the design^[14].

5.3. Interactive analysis in virtual learning environment

Virtual learning spaces are teaching and learning environments that support non-face-to-face teaching and learning, provide user realism, and integrate multiple interaction methods^[9], virtual learning environments are applications of virtual reality technologies in education, such as virtual classrooms and virtual laboratories. The use of virtual learning environments can break through the limitations of space and time, allowing learners to learn, explore and experience in a virtual context with a certain degree of immersion. The key to building a virtual learning environment is the design of resources and interactions. At present, a lot of literature has been researched on how to build virtual learning environments, but most of them are technology-based, while the design methods of 3D animation resources and interactions are not summarized enough and lack the necessary teaching design concepts. The purpose of constructing virtual learning environment is to promote learners'

learning, and scientific and educational nature is its primary characteristic, which is also an important principle that must be followed in the design of teaching field. At the same time, the design process of virtual learning environments should also pay attention to its artistry and interactivity^[15].

The study of the factors influencing the interaction effect of virtual communities shows that teachers, students, platforms, network environment, goals, content, resources, sense of community belonging and community atmosphere are conducive to enhancing the community interaction effect, and in the specific interaction process, we should play the supporting role of teaching with big data in community interaction, and target the community interaction with subject design, supporting factor design, target content design, resource design, and cultural design in order to improve the effect of community interaction^[16].

6. Conclusion

From the perspective of interaction content, educational scholars have conducted extensive and in-depth research on the interaction problem in distance learning. Good research progress has been made in both theory and practice. However, at the same time, there are also problems such as the technology of the interaction platform needs to be developed and improved, the teaching mode is single, the methodology system is lacking, the depth of interaction needs to be further improved, students' attention is easily shifted and their self-control is insufficient, and teachers are not proficient in the functions of the platform, which need to be explored.

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