

## Gamification interaction design of online education

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**Abstract**—One of the fastest growing use of technology is for online education which is a trend of contemporary education. And it is continually improving with constantly developing and revising its programs to suit today's students. This paper analyzes the existing problems of interaction design for online education, discusses a user-centered gamification interaction strategy, with the purpose of improving the utilization rate of online education resources and realizing the optimization of teaching effect and user experience. At last, it explores the future development of online education interaction.

**Keywords**—user experience; user centered; human-computer interaction design; online education; game learning.

### I. INTRODUCTION

Countless forms of online education are provided worldwide at present by colleges or training institutions. The online education becomes one of the largest demands both in the field of internet and education. Typical online learning systems are designed for executing operation and demonstration of teaching content. Although they work, it is worthy to discuss how to make them better to use.

Interaction design is an important dynamic guarantee for the quality of teaching in current network education. Gamification interaction of web education aims to give full play to the idea of edutainment, to realize learner-oriented education, and to pay attention to the students' subjective initiative and creativity. Interaction design of online game has its unique strong attraction, and is valuable to apply to e-learning interaction design. The purpose of this article is to develop edutainment interaction from users' perspective, which is efficient, pleasing, and easy to use.

This paper is presented in nine sections. It explores the concept and feature of interaction design and on online education, highlights existing problems, discovers advantages of online game, suggests gamification interaction strategy for online education. The concluding section discusses the prospect and future of interaction design for online education.

### II. INTERACTION DESIGN AND ON ONLINE EDUCATION

Interaction Design was born in the 1980s as a new discipline. The purpose is to make products accomplish usability target and user experience goals. The core is to seek a balance between human and technology. So people not only achieve particular goal in the process of interaction with

the product, but also get emotional and spiritual enjoyment. In the internet age, interaction is a two-way communication and participation process that emphasizes information input and output, which achieves information exchange between human and computers. The influence involves thinking, behavior, sense, language, psychology, etc. The feeling in the process of using is a kind of interactive experience.

The purpose of web education interaction is to construct learners' knowledge and develop their ability under the network environment. Traditional interactive mode of classroom-teaching mainly occurs between teachers and students by real-time face to face communication. But online learning provides richer interaction forms in virtual environment, including: Control-interaction between learners and computers; Instruction-interaction between teachers and learners; Information interaction between learners and learning resources and learning task; Response -interaction between learners and teachers. Learners are the core of those interactions.

### III. FEATURES OF ONLINE EDUCATION INTERACTION

#### A. Learners enjoy freedom and equality

Compared to traditional classroom-teaching interaction, technologies change the way people obtaining and sharing information. It breaks the constraints of time and space. Learners can fulfill the desire of learning at any time in any place. A wide range of learning resource, quality courseware is supplied to meet the needs of learners. The inequality due to individual identity and different background may be eliminated.

#### B. Roles of teacher and learner change

In traditional classroom, teachers have the initiative of the entire teaching activities. But in the online education, learners conduct independent learning process and have more initiatives of personalized control on time, speed, learning content, and communication. It embodies a kind of "learner-centered".

#### C. Separation of time and space appears

The interaction of traditional classroom is face-to-face. Language, facial expression, talk tone or action is a kind of interaction between teachers and students. Teachers can read from students' face about whether they understand. In the network learning, the separation of space and time appears. Students study through online resources and database, and

express opinions and communicate by e-mail, BBS or FTP. This kind of asynchronous interaction enables learners to arrange their activities, and to have sufficient time on comprehensively thinking. The learning process is more flexible controlled.

#### D. *Virtuality is another important feature*

Virtual reality technology establishes a virtual interaction environment that creates immersive experience of looking, listening and touching. It realizes an immersive virtual world and multisensory space for teachers and students through model-building, space-tracking, visual and a uditory information capturing.

### IV. EXISTING PROBLEMS OF ONLINE EDUCATION INTERACTION

#### A. *Lack of user analysis*

Interaction has an information transmission loop: from sender to receiver, eventually back to the sender. The participator can be teachers, learners, computer systems or all things that be able to receive and send information. Only when the loop is complete and closed, the interactive process is completed. Usually receiving feedback is considered as a mark of completed interaction.

The purpose of webucation interaction is to make learners achieve knowledge construction. So the interaction should put learners in the center of the loop. But now a lot of interaction is designed from the teachers' perspective. The possible situation is that, when teachers think it is a complete interaction loop, it is not from the perspective of learners. In this way, learners cannot get feedback on their learning activities. It not only is difficult to determine the next step of learning, but also bring negative effect on the enthusiasm and initiative.

Some webucation systems emphasize the technology factor and teaching content. But learners' personal intellectual level and cognitive structure is ignored. It is not good for achieving quality education and cultivating students' exploration spirit and innovation capability.

#### B. *Simple packing of teaching resources*

A lot of online learning systems focus on teaching resources construction. A large number of relevant resources are listed out, which just move and list the courseware and teaching resource on the internet. Content of books are piled up through digital way. The update speed is slow, lack of dynamic interaction, and not fit the learners' personal characteristics. The interaction only exists between the learners and the content, simply browsing and jumping between web pages. The presenting form of teaching content is monotonous and the hyperlink navigation makes learners easily fatigue.

#### C. *Lack of effective interaction between teachers and students*

Interaction and communication between teachers and students are important for attaining teaching aim. They are key factors to make the education quality. These help

students to accumulate knowledge and cultivate ability; as well as stimulate them to think about more questions actively. The importance of social interaction in learning is proved. When social interaction occurs between learners and teachers or learners and companions, it helps maintaining motivation. Learners will produce corresponding self-evaluation. It will help to widen the horizon, deepen their understanding, and improve the ability of collaboration with others. At present online education interaction rarely involves synchronous communication, and the assessment lacks timely evaluation. So there is still unsatisfactory that cannot meet the need of students.

#### D. *Low utilization rate of interactive function modules*

The existing webucation platforms mostly support interactive function modules for students and teachers, such as BBS, E-mail, chat tools, Blog, etc. The purpose is to make communication and discussion more often and deep between teachers and students, or among students. The modules relate curriculum resources, questions, answers, assignment, test, discussion, cooperation task, etc. But the utilization rate is very low. And the existing interactive activities are mainly between students and curriculum resources, and confined to testing.

#### E. *Neglect of emotional factors*

Learning is not only the process of knowledge acquisition, but also emotional experience. It is the integration of cognition and emotion. The theory of distance education interactive model ignores the important role that emotional factor plays in learners' cognitive development. So the problem of emotion-loss emerges gradually. Emotion interaction focuses on the individual emotional experience. As to webucation, it is concerned about learners' psychological tendency of mood, emotion, attitude, evaluation in the e-learning interaction process. Thus it plays a positive role in promoting personal cognitive development.

The webucation obtains effect through the learner's independent operation. But the necessary real-world learning environments and corresponding activities are lacking; in addition, the learners and teachers and their companions separate in space and time. So it has no traditional classroom harmonious learning atmosphere, and no emotional face-to-face communication. The process lacks sufficient communicational guidance, feedback and help. The design of diversified roles and exploring activities is also insufficient. It is easy to cause the learners' lonely feel. From education point of view, this is a disadvantage of online education.

At present, the technologies applied in the online education interaction commonly give more attention to the beautiful webpage, necessary operation, and fully display of teaching content. But it is difficult to meet learners' needs of participation, belongingness, independence, exploration and other psychology. Physical scene and mental scene design is insufficient. So problems still exist in prompting a learner's curiosity, learning interest, desire of success, self-confidence and other emotional experience.

## V. GAMES' CONTRIBUTION TO EDUCATION

Games generally exist in animals, earlier than the existence of human. Games have a large proportion in the human social life, and continuously develop. In the internet age, games also embody the feature of times. The most typical one is online game which mixes entertaining, competition, simulation, interactivity, and becomes popular in the world.

There have theories as follows: Schiller's instinct theory of play; Piaget's cognitive game theory; Herbert Spencer's residual energy theory; Karl Groos's practice theory. Game is based on human instinct and residual energy. It is to practice simulated real-life, strengthen knowledge and capacity, promote intelligence, release emotion, and develop social consciousness. Games' purpose is un-utilitarian, in order to get happiness directly.

In ancient Greece, Platonic Academy established for children learning in games. With the development of society, too much rationality is attached to the education. That makes education become a tool. So there is little interest in learning. It is more of burden for learners. Game-based learning puts learners in a more relaxed and happy learning environment, and pays more attention to the cultivation of students' initiative and creativity.

MarCPrensky thinks learning revolution in the 21st century is not the realization of digitization, remoteness, network, wireless, broadband, real-time or the emergence of learning management system. The revolution is to learn with "no pain". Education and game are entirely different, but can integrate. We not only accept "serious" education, also "Gamification" education.

## VI. INTERACTIVITY AND OTHER ADVANTAGES ABOUT ONLINE GAME

Online games create a virtual environment with human-computer interaction and human-human interaction. Compared to film, television, animation, music, concert, performance, and other entertainment forms, online game has the strongest interactivity. It not only develops technology of virtual reality but also takes interpersonal interaction to a new field. Richard Rouse puts in his book "Game design: theory and practice": Players expect to play instead of watch. Digitization extends human activities to a virtual world and networks. The interaction of online game is to arouse people's activity desire, to achieve existence experience in the control and anti-control process. First of all, the relationship of people is injected to the game event, so the entire game has more plot and interest. Secondly, the computer makes fast response in time, so players can enjoy the pleasure through competing reaction rate. In addition, the diversity of interaction design increases the appeal of the game. Through the virtual interactive mode, players can entirely immerse in the continuous changing game environment. Empirical practice also affects the user experience through the interactive way. The interaction of online games can be divided into two parts: players' interactive way: through this way players play the game and control the events and characters; games' interactive

response: games feedback to the players. The more diverse and real they are, the more possibility the players will have, and stronger the interaction will be.

### A. Advantages and characteristics of online games:

1) *Learning characteristic*: When players participate in, they merge in virtual reality, gradually understand the environment and get close to the targets. It is a process full of investigation, inquiry, learning, and grasping the rules and solving the problems. Online games effectively create learning situation, support cooperation, practice knowledge, as well as promote expression and self-reflection. Players often discuss how to win, reflect on failure or success, and draw lessons from the past. In fact, online games integrate quiz, puzzle, situation learning, collaborative learning, network instruction and other educational characteristics.

2) *Social characteristic*: Online games can promote interpersonal interaction and communication. Players often communicate on common topics of games in BBS, discuss game strategies and exchange experience. Without true identity, players may feel more at ease, free and relaxed than in real life. In addition, online games emphasize cooperation. So many Attractive games need players form a team, and complete the task together through positive cooperation.

3) *Entertainment characteristic*: As a kind of entertainment means, it contains moving story plot, rich audio-visual effect, intense participation, adventure, mysteriousness, suspense, recreation, competitiveness, simulation, role playing and emotional encouragement, deeply attracting players. The application of web3D and multimedia technology is already quite mature in online games, bringing fully audio-visual sensory entertainment and enjoyment. Beautiful image, fascinate screen effect and hi-fi stereo effect builds a virtual wonderful world, in which players choose their favorite role, open up the wings of imagination and experience their ideal life. The scene design, role design, activities design is individualized and diversified. It takes account of the demands of users' psychology and artistic feeling, and commercialization.

### B. feature of online games' interaction design:

1) *Task mechanism*: Players generally immerse in the task context which has virtual reality interface and perfect timely feedback system. Players do every task according to the requirement after claiming it.

2) *Real-time information*: The interface timely displays players' status information, including the current experience, blood, mana cost, etc. When moving the mouse onto the corresponding status bar, players see exactly how much is it or whether it is full, then decide when to upgrade, add blood and fight with monsters.

3) *Teamwork*: Some tasks need players do alone and others are group tasks, in which one player is the captain, responsible for leading. This embodies the spirit of collaboration in a team.

4) *Reward and punishment mechanism*: Players get corresponding reward and punishment. When completing a task, their money and experiences increase as reward, on the

contrary, reduce as punishment. This kind of mechanism meets the players' psychological self-fulfillment.

5) *Perfect help and navigation system*: Online games provide helpful messages, texts, or beginners' trainings. Navigation is indispensable, because it avoids losing. Players determine their position then choose the next step and take action.

6) *communication tools*: All kinds of communication tools are provided for players, such as e-mail, electronic bulletin boards, real-time chat systems, video or audio chat systems, etc.

#### VII. JUNCTION BETWEEN ONLINE EDUCATION AND ONLINE GAME: SITUATED COGNITION

Players of online game and students of webucation all conduct activities and target goals in the network environment, so there is something in common. Situated cognition theory is an important research which is recognized after "stimulus and response" behaviorism learning theory of animal behavior research model, and "information processing" learning theory of cognitive psychology. Situated cognition theory thinks that learning is to form individual knowledge structure which comes from the cultural practice under certain social context. And the knowledge obtained in real context is more useful and memorized. Situated Cognition and Learning has the following basic features:

1) *Situation orientation*: People contact with the surrounding environment then make decision. Based on the situation, they reflect their actions and design new methods to solve problems.

2) *Peripheral participation*: Learners become members of the group. New members grow, gradually moving from the community's edge into the center. They gradually engage the culture, and become experts of the group. The situational learners must be legitimate participants of the community rather than passive observers. They may not fully participate in all activities of the community but in some activities and learn through observing the experts and discussing with their companions. So in such community, the experts should as far as possible to demonstrate their knowledge and skills.

3) *Communities of practice*: The concept emphasizes learning through activities with purpose and the importance of practice and community. Learners detail their belief and behavior in the community. When they gradually move from the edge to the center, they understand more community culture, and their actions become more positive. They contact experts more widely and gradually and begin to play the role of experts or veterans themselves. When it occurs in using the knowledge in the society or natural situation, it is meaningful. The mode based on Situated Cognition and Learning includes anchored instruction, random access learning, cognitive apprenticeship, and teaching based on interactive multimedia.

#### VIII. STRATEGY FOR ONLINE EDUCATION: GAMIFICATION INTERACTION

##### A. Different learning strategies according to different learners

Learners' motivations, initial abilities, learning styles, personal characteristics directly affect the interaction.

Learning motivation triggers and maintains learning activities, because any process of knowledge-acquisition needs learners' actively participation. Setting tasks and questions is an effective method to wake up learning motivation and cognitive drive. Obtaining successful experience in the learning process is another mean. Once they succeed, their confidence and self-efficacy will be strengthened, which provides assurance of successfully completing a task or reaching a predefined level. It fits Vygotsky's theory of "Zone of Proimal Development" that the difficulty of network learning activities and tasks should be controlled in the environment of independent study. So the learners achieve specific goals on and off, feel growth and progress, experience the joy of success, and increase their ability.

Initial ability includes communication ability and previously acquired skills. The communication ability refers to learners' knowledge and skills when interactive communicating. The previously acquired skills refer to learners operating and controlling computers with no direct help.

Learning style is the psychological characteristic that affects two aspects: perceiving stimulus and responding to stimulus. Witkin divided it into field-independence and field-dependence. Field-independence learners in cognitive activities tend to use internal reference as the basis of information processing. They have strong self-interactive ability and can reorganize provided information. More interactive paths and tools should be provided to this kind of learners so that they can reorganize the study materials. Field dependence learners like interpersonal communication of collective learning situation. All kinds of interpersonal network interaction should be provided to this kind of learners, such as group discussion, role playing, simulation contest, etc., with clear guidance and precise learning materials.

Games are learner-centered explosions. When players come into a game, they also fall into a complex learning environment. In some games, players open up a piece of territory through the careful tentative detect and investigation. In other games, players stroll and interact unrestrainedly with all kinds of people or things that the system sets, then are gradually familiar with the characteristics of other things. In both ways, players are in a state of active exploration learning. And this kind of learning is effective because almost all the game software gives timely feedback for players' actions, and the feedback are generally encouraging. Successful actions bring about benefits such as experience value increase or upgrade; failure actions produce spur and suggest that is in order to bring success the next time. The

exploratory learning process greatly stimulates the learners' active consciousness.

Players are the center of the game interaction. It is most important that operation mode and interface design is playable, interactive, and understandable according to players' physiological and psychological need. Before designing the games' interface, investigation and analysis conducts on the target users' age, gender, income, psychological characteristics, life-styles, and user preferences, etc. The design that meets the demands of players comes after comprehensive research. So before design the interaction of webucation, the learners' state should be attached great importance, such as their equipped knowledge, learning styles. It also should be challenging to cause learners' active learning interest.

### *B. Improve learning environment*

Learning environment includes physical environment and nonphysical environment. The physical environment refers to learning resources. The nonphysical environment refers to learning mode, learning strategy, learning atmosphere, interpersonal relationship, etc. Online learning environment also includes network factors that provide students a virtual place of independent study, communication and cooperation. In a good webucation environment, students actively participate in the process of problem solving, and form good cooperation, competition relationship with online learning partners.

Situated cognition theory emphasizes learning in the real situation. It maintains learning is a process that learners, with the aid of other people, use the necessary learning resources to do meaning construction. It emphasizes the environment similar to real situation. The Internet puts texts, graphics, images, sound, animation and other multimedia technology together organically, to create vivid and lifelike environment for the meaning construction process. It creates rich resources situation, case situation, problem situation and activity situation for learners, so as to arouse learning motivation, spur their participating in and exploring actively, and help to acquire and maintain knowledge.

It can be learned from online games. So the online learning interaction should generate a virtual environment that is the integration of lifelike looking, listening and touching. Users influence each other with the objects in the virtual environment naturally, which is similar to the real environment of feeling and experience. It offers users free, comprehensive, and diversified interaction involves visual perception, auditory perception, tactile perception, olfactory perception, motion perception, etc. Multimedia sensory stimulation in the webucation environment brings enjoyment and emotional experience and improves learning interest. Online games provide necessary guidance and support, and promote players to complete the task. It can be also applied to the online learning interaction design.

Learners conduct the interactive operation through the learning software and web page interface. So webucation interface plays an important role in online learning interaction. The user interface (UI) mainly have three forms: graphical user interface (GUI), solid user interface (SUI) and

audio user interface (AUI), corresponding to the three main ways the human perceiving outside information. These forms related each other and have very strong logicity. Visual sense mainly plays the role of picking-up information of images, texts, buttons, shapes and layouts, etc.; touch helps the operation such as adjusting knobs or pressing buttons or screen; auditory sense gives a kind of feedback to the operation, through background music, fight sound or warning tone, etc.

The game interface is a kind of user interface. Players join the game, acquire entertainment experience, and control roles through the game interface which gives players timely feedback of identity and status. The key elements of game interface design directly or indirectly impact on the players, including buttons, texts, images, animation, voice, windows. The game interface is an integrated operating environment, which is a tool of information transmission and exchange between the players and the game software system. Bill Volk wrote down an equation of game design: "interface + product elements = game", which emphasizes the importance of game user interface design. The designers of Age of Empires put forward a "first 15 minutes law". If new players can't successfully understand basic operation rules and strategies, or a veteran can't feel interesting and challenging in the first 15 minutes, they will leave the game and never do further attempt again. Because our brains prefer to things which need less work. Bill Poper, the vice-president of Blizzard Entertainment said: "easy to begin, difficult to master", which summarized the principle. That is, the game interface should be easily to understand about how to play, and the users enjoy the pleasure of friendly man-machine interaction in the process. The principle is also suit for webucation. So the interface should be easy to understand and accept, and the learning environment should accord with intuitive sense of common sense as far as possible. As to its hardware, the most primary goal is to make learners as soon as possible get into the role, through the keys, buttons, touch screen or other input way.

### *C. Allow learners to select control strategies*

Now, most online games attract player due to the controllability. Games provide all sorts of roles, different background, and many tools for choice. If players failed, they can change a way to start over. Players have a lot of control authority of their operation. They can fully participate in and enjoy it as long as they are under the rule of the game.

Self-organization and openness of the network promote the application of "learner-centered" in the interaction design. The self-directed online-learning process is controllable, which includes learner autonomic control and program control (or teacher control). Absolute teacher control is not appropriate, because it may reduce the learners' learning initiative.

In the online learning, if the learners become masters with control responsibility and interaction initiative, they will perform best learning enthusiasm, and find learning content, schedule and methods according their own condition and need. But the research of learner control strategy effect

shows that, the complete learner autonomic control strategy is not suitable for all students.

For the students whose self-learning ability is not so good, the teacher control, or the learner control with teachers' counseling can achieve good learning effect. The proportion of teacher control and learner autonomic control varies according to different teaching contents. Learner autonomic control interaction is suitable for analyzing, integrating and evaluating, including demonstration, debates, simulation, role playing, testing and case analysis. Teacher control interaction is suitable for programmed and declarative learning, for example, displaying teaching-content online, answering questions, instruction, guidance, and participating in discussion through cognitive tools in the form of texts and graphics.

#### *D. Increase flexibility in learning process*

As independent individuals, the learners' knowledge level, learning motivation, cognitive style is different. Their learning process is completely personalized with individually learning path and learning strategy. So when design webucation interaction, it is reasonable to describe the learners' individual differences by using student model; and adapt to learners' individual difference by increasing selectable learning scheme. For example, to design learning activities and resources in varied forms, and give them more choice of learning objectives, action forms, learning tools, communication objects to meet different needs of learners.

#### *E. Provide timely and effective feedback information*

The purpose of webucation interaction lies in the learners' knowledge structure and online learning environment of information transmission and communication. From the standpoint of cybernetics, any learning system should be a controllable closed-loop system. Feedback refers to any information that makes learners evaluate their own performance. Obviously feedback is essential for achieving goals designed in the webucation interaction. So learners can decide further steps according to the feedback information which contains results evaluation and has great significance for arousing and sustaining learning enthusiasm and initiative. Feedback provides real-time judgment through which, learners can immediately know whether the operation is correct in learning process.

Feedback for learners in the webucation interaction not only should be in time, but also informational rather than judgmental, so that it allows learners to reflect and to know their present learning situation is how far from learning goals, and where to go in the future. Support should be provided to help learners to complete the task, offering heuristic help throughout learning environment and process, when learners need. As learners improve their independent abilities, the scaffold is gradually moved, and then the learners' fully independent study comes.

#### *F. Establish individual record module for learners' status*

Online education builds e-portfolio, but it's always too simply and need learners click on the page to have a view. If the record module for learners' status starts from the learners

logging in, through it learners will know their learning status data more conveniently, including online time, completed learning task, personal evaluation level, and other online learners. The e-portfolio function is also added, showing evaluation information. In this way, learners can get personal learning status at any time.

#### *G. Design different learning tasks*

In learning activities which many people participate in, collaborative learning task design can be emphasized, including personal tasks and group tasks. At the same time, the proper amount of competitive factor can be added. It is more helpful to stimulate learning motivation, cultivate creativity and improve learning effects.

#### *H. Establish learning reward mechanism*

One of the most attractiveness of online game is getting a strong sense of achievement in the process of playing games, which greatly arouses the players' enthusiasm. Similarly, in the webucation, if learners quickly experience their own achievement, they will feel multiplicative confidence and enthusiasm, thus the learning effect significantly increases. So the virtual reward level similar to the game rating can be built according to the learners' online time, quantities of completed tasks and other recorded data, which is also appropriately reflected in the final test scores.

#### *I. Provide learning help and navigation*

The necessary help and navigation system is indispensable, no matter for online game or online learning. Inner support in the learning process guides learners to gradually achieve goals and success. Perfect navigation system lets learners know their place, avoid drifting off and getting lost in the e-learning process.

#### *J. Value emotional interaction*

Great wealth of material production in the modern society is increasing, but emotion among people is diluting with the fast-paced life. Emotional need and spiritual need are more concerned. So the interaction design should pay more attention to the emotional communication. Online games set good examples, strengthening interpersonal emotion. So people get more real-world friends through network way in the virtual world. Online interactive tools such as online chat, e-mail, BBS, question-answering system, as well as some web technology get wide range of application in games. These interactive tools provide possibilities, and the interaction can integrate the factors of human life and emotion into the network learning, making learning more than a personal experience, but also a way of improving emotional communication. Whether they are efficient in the webucation depends on the learners' initiative and the design of the interactive tools.

A gamification interaction design of webucation makes learners master knowledge in the process of gameplay, as well as stimulates learning interest and improves learning motivation. With education as the purpose and game as the means, knowledge will be acquired through entertainment and the idea of edutainment embodied. Learners can compete

with the computer or other learners in the game scene. When they overcome all sorts of challenges in this delight process, they acquire skills and improve strategies. This kind of interaction design is educational, instructive, playful, recreational, explorative, interactive, experiential, challenging, competitive and cooperative.

#### IX. PROSPECT AND FUTURE OF INTERACTION DESIGN FOR ONLINE EDUCATION

Human-computer interaction is developing. Virtual reality, multi-channel, free interaction is important trends. Along with other forms, they affect interaction of online education. New interactive technologies structure more harmonious man-machine environment for e-learners.

##### A. Multichannel and free interaction

In daily life, people prefer to communicate face-to-face. Because information transfers through various sensory channels, expressed by voice, emotion, countenance. Multichannel interaction refers to the interface combines two or more method of input or output, such as voice, pen, touch, gesture, watch, countenance, action, etc.

Computer and the Internet greatly enriches virtual experience when information and resources is obtained online. Just because of this, tangible interactive modes are scarce and more valuable, and meet human psychology and physical behavior demand. This is the social psychology reason to liberate limbs and get really tactile interaction. Body language interaction is obviously more welcome than monotonously traditional human-computer interaction.

More and more input device is applied in games. Movement, language, bearing becomes interactive way to give instruction. Free interaction makes people do not have to be fixed in a posture or limited to the specific game equipment. It greatly expands freedom when people participate in, which bring more truly immersive experience into the virtual world. The single-screen interface mode is developing toward the multichannel interaction mode.

Multiple information channels make interaction more diversified, natural and comfortable. Users can not only input with fingers, but also through body movement, voice, facial expression and watching. Multi-channel interaction remedies defects of screen and keyboard, reduces users' dependence on physical interface, improve their operation efficiency and bring entertainment. Users not only can enjoy the fun but also do physical exercises. It is more healthy and free than the traditional mode, and it also expands the user group that, people with physical disabilities or visual impairment can enjoy too. Multichannel and free interaction brings users more effective, flexible, natural experience and points the

future way of e-learning interaction design. This mode has very wide application in various fields and also will affect network education industry.

##### B. Self-adaptive human-computer interface

It estimates users' environment and makes feedback in the light of the scene. Along with the technologies of positioning, sensor and ubiquitous computing, machines currently have more accurate perception of the environment. They read the information of sound, temperature, humidity, brightness, etc., and automatically adapt to the situation.

##### C. Natural human-computer interface

No longer confined to the screens, the ubiquitous computing will trigger a new revolution of the interface. Equipment or interface exists for function that extends people's cognition and breaking limitations (such as calculation speed, memory capacity, etc.). It helps people to accomplish various tasks, not increasing cognitive load. Senior form of interface will exist in the process, when users experience the good feeling of fulfilling the task without noticing the existence of the interface.

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