

Present State of Videogames and Learning Games – Use and Effects –

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1. The Japanese Situation

Japan has many strong videogame industries and videogames are widely utilized everywhere by a large range of age groups. Most researchers and critics are looking at these phenomena just as one of many fashionable trends and do not consider videogames an important target of research. However some academics and critics have discussed the reasons for broad acceptance and the potential influences of videogames. The number of research studies conducted in Japan may be second only to the number in the USA. But from the pedagogical and psychological viewpoint, some researchers have been conducting impact studies of videogames and learning games with the goal of achieving valuable and useful research results about the effects on educational performance in game players and learners.

2. Characteristics of Impact Studies in Japan

Though a variety of impact studies on videogames and learning games have been undertaken, the main characteristics unique to Japanese studies are as follows:

1. Comparative impact studies under experimental and quasi-experimental conditions,
2. Panel studies using the Cross-Lagged Effects Model,
3. Analysis of brain activities in the prefrontal cortex by spectroscopy technologies,
4. Surveys of the videogame players,
5. Content analysis of videogames, and
6. Consideration of theoretical problems.

3. Type of Mini Videogames

Most of the targets of impact studies in videogames and learning games are mini games, though there are many complex games using large scale simulation systems. Mini videogames can be usually classified into the following types: action, fighting, puzzle-solving, role-playing, simulations, sports, strategy, and learning.

All types of mini games are widely played by children. According to the statistics in years 2000-2001 on daily use in hours of videogames among 780 primary and 1,050 secondary school age children, 1.59 hours per day were spent on the average for playing by primary schoolboys during weekdays and 2.76 hours per day on the weekends. By contrast 0.68 hours per day were spent on playing among primary schoolgirls during weekdays and 1.43 hours per day on weekends. Primary school children played more on weekends than on weekdays and boys

played more than girls.

Similar tendencies are also found among middle school and high school boys and girls. Namely 1.29 hours were spent playing game in middle school boys during weekdays and 3.11 hours on the weekends, but 0.58 hours were spent playing games in middle school girls on weekdays and 1.51 hours per day on weekends. In high school students 0.88 hours were spent for playing by boys on weekdays and 2.09 hours on weekends, but 0.41 hours were spend per day by girls on weekdays and 1.15 hours per day on weekends.

It is shown that the daily number of play hours are decreasing from the younger groups to older groups during weekdays. But on weekends middle school boys and girls played more than primary and high school age groups. Therefore it is important hat the analysis on the influences of videogame played on weekends and particularly by boys should be carefully conducted.

Other statistics shows trends of game use across different grade levels.

Particularly interesting characteristics are that games are more frequently played than other activities and remain the highest rank in every age group. But searching activities in the Internet are drastically increasing according as the growth of children progresses from 1st grade to 6th grade.

4. Educational Attributes in Videogames

Videogames are played so widely and frequently. Games are known to have many attractive features which include can stimulate improved educational performance in learners and children.

Some of these traits include: attractiveness, motivation, active engagement, challenges, data handling capabilities and enabling learning by doing. If ordinary classroom teaching would have these characteristics, children would study more enthusiastically, but these features are usually absent in ordinary classrooms. . Introduction of games in class may be quite useful and more effective for learning. In conventional classroom teaching educational materials do not always such challenging, vivid and complex features as materials that are shown in game content. These characteristics of content in games could stimulate learning behaviors in learners. Games also have other educational attributes such as functions for enhancing self-feedback, personalization and collaborative learning.

5. Psychological and Pedagogical Effects of Videogames

Videogames have a variety of instructional functions to promote educational performances in learners. Games show models for living and so have modeling functions to learners who would imitate the behaviors shown in the model. Of course games have strong verbal instruction functions in an attractive atmosphere. Games also have attractive visualizing functions for complex phenomena. Games stimulate meta cognition in learners, because performances on the screen can be objectively observed. Games give the intellectual and affective Knowledge of Results corresponding to learner behaviors. KRs could become a kind of reward to reinforce appropriate components of behaviors. Games often have rehearsal functions, using repetition to achieve the educational and training goals.

Because learners and children are playing games having many aspects of educational functions, they should achieve and enhance various kinds of abilities and competences. These include: knowledge, skills, planning, creativity, problem solving abilities, strategic thinking,

communication abilities, negotiation abilities and group decision making abilities. It is desirable that numerous videogames having better educational and psychological functions be produced.

6. Content Analysis of Videogames

Sixteen videogames provided from three software firms having high rankings on content sales were selected and evaluated by 8 raters in terms of 75 items from 12 different checklist categories. It was found that the top five items commonly provided for much software content, immediate feedback to wrong answers, less input, correct information and seamless use. The lowest 5 items that provided less commonality among different software content were: manuals for teachers, promoting collaboration, validity studies, supplementary content, and information about the customer who is to be satisfied. It seems that important instructional attributes for promoting learning are generally not so well equipped.

7. Research Results by Panel Studies

Many impact studies mainly using Panel Analysis have been undertaken since 1998.

The main research findings are as follows;

1. Videogames stimulate aggressive behaviors.
2. Videogames have no particular relationship to social maladjustment in primary and secondary school children.
3. Videogames affect social maladjustment in university students.
4. Videogames show negative influences on logical thinking and attitude towards school.

One panel study using the cross-lagged effects model on 780 5th grade and 1050 8-10th grade students found the following: "Videogames lower empathy", "Videogames including prosocial scenes stimulate prosocial behaviors" and "Parents have negative attitudes towards videogames."

Another experimental impact study was conducted regarding the effects of aggressive games on later aggressive behaviors in university students.. Students were assigned to one of the five different conditions; realistic game play group, non-realistic game play group, realistic game watch group, non-realistic game watch group, and control group watching film consisting of neutral scenes. In one experiment 52 subjects were asked to give another person electronic shock when she committed errors in a problem solving situation and in another experiment 41 subjects gave unpleasant noises in the similar situation instead of electronic shock. The intensity and the duration of electronic shock and noises were measured as an indicator of aggressiveness. The results showed that (1) videogame play promoted aggressive behaviors, (2) the game play group showed more aggressive behaviors than the watching group, and (3) influences were the strongest when games had high rewarding and realistic qualities.

8. Impact study on Sociality

1,519 videogame players were selected out of 16,885 people based upon the three factors including age from 18-49, videogame enthusiasm, and positive attitude towards videogames. Twelve features of sociality were adopted as target components: self confidence, self control, decision making, avoidance from problem situations, coping with important situations, creativity, trust in others, communication, social rules, service mindfulness to society, world member, and good care of nature and living things. In the table the three best games regarding

the aspects of contribution are shown in each feature of sociality. Final Fantasy and Dragon Quest were the two top games in most aspects of sociality. SimCity was found in the third position on several features of sociality. The results also showed the causal effects by cross-lagged effects model: (1) practice among other different characteristics such as admiration, proposal, knowledge, indication, interaction with reality, and reflection of reality in games is generally the strongest influence among all aspects of sociality, (2) the system has strongest effects on many aspects of sociality with story being second, and (3) motivation among other mental factors such as interest, knowledge, value, etc. in players had a strong impact on sociality.

9. Impact of role playing shy behaviors in a MUD on shy behaviors in the real world

In the first stage subjects who showed strong shyness and had high typing skills were selected from female university students. Then they were assigned to the experimental group consist of 20 students or the control group consisting of 19 students. The students of the experimental group played in Habitat II for 30 minutes, after 10 minutes practice, as if they were social persons. Students of the control group watched an animation film for 30 minutes. After that the subjects were asked to wait for the next work assignment in the waiting room. In the room there was another person sitting and she seemed to the subject to be also waiting for the next work assignment. Responses of students to the conversation with the person in the room were assessed as indicators of shyness by the experimenter who played another person waiting for the next work assignment in the waiting room and by the rater watching video recorded behaviors of subjects. The results showed that the behaviors of shy students in the real world were improved by the experience promoting social behavior in the MUD.

10. Reason why videogames are not yet so popular in K-12 School Education

According to responses to a questionnaire, after playing the mini learning games for environmental education, many advisory teachers for environmental education answered that the mini game for learning recycling called KURU-KURU was interesting, useful for learning, and usable in class.

But at the moment videogames and learning games are not so well utilized for K-12 school education. Several reasons might be pointed out. From the viewpoint of games, some difficulties are related to the integration into the curriculum, costs, and good instructive design. Learning games are still poor, simple, boring and require learners to have proper skills for operation. Entertainment games do not yet have high educational value and significance for educational use. From the standpoint of human factors, there is still a lot of misunderstanding, negative perception, innocence, and negative attitudes towards games among the boards of education, school principals, teachers and parents.

11. Final Remarks

The following describes the present state of videogames and mini learning games in Japan:

1. Use of network games for online and mobile phones is increasing year by year.
2. Markets for network games are developing.
3. Package type games are being gradually replaced by network games.
4. Children will learn from learning games without much effort.

5. Teachers are interested in using learning games.
6. Teachers consider learning games useful for individual independent study.
7. Many impact studies of videogames on educational performance in learners have been undertaken.
8. Among the most interesting approaches there are experimental studies and panel studies using cross-lagged effects models for evaluating causal effects of games on social behaviors. Some results show positive influences but some suggest negative effects.
9. Videogames include a variety of educational characteristics, teaching and learning functions that hold promise for psychological and pedagogical effectiveness.

Use of videogames and learning games will be getting more popular in K-12 school education and also in lifelong education on the networked learning society in the 21st century. More research studies and practical experiences are strongly needed.

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