What Makes Things Fun to Learn? A Study of Intrinsically Motivating Computer Games

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"the most impressive recent work in intelligent computer-assisted instruction has involved programming elaborate cognitive models of the learner so the program can make real-time instructional decisions based on inferred knowledge states of the learners." (P. 2)

"Another growing body of research has begun to explore the conditions under which external reinforcement destroys the intrinsic motivation a person has to engage in an activity and degrades the quality of certain kinds of task performance." (P.2)

"Another reason for hesitation in the indiscriminate use of external reinforcement as a motivation comes from the work of cognitively oriented learning theorists (Piaget, 1951, Bruner, 1962) who argue the importance of intrinsically motivated play-like activities for many kinds of deep learning." (P.2)

"If students are intrinsically motivated to learn something, they are likely to spend more time and effort learning, feel better about what they learn, and be more likely to use it in the future. Some theorists would also argue that they may learn 'better' in the sense that more fundamental cognitive structures are modified, including the development of such skills as 'learning how to learn." (P. 2-3)

three characteristics of intrinsically motivating environments
- challenge, need for a goal with an uncertain outcome
- fantasy,
- curiosity,

"One of the most important features of intrinsically motivating environments is the degree to which they can continue to arouse and then satisfy our curiosity.... While attributes like color made little difference in choice of play object, novelty was very important indetermining which toys a child began playing with, and complexity -- either of construction or of possible uses-- was crucial in determining how long a child played with a given toy." (P. 5-6)

"The kind of complexity or incongruity that is motivating is not simply a matter of increased information in the technical sense used in information theory. Rather it involves surprisingness with respect tothe knowledge and expectations a learner has.... there are limits to the amount of complexity people find interesting. They postulate that there is some optimal level of informational complexity for a given person at a given time." (P.6)

discussing fact that fantasies that worked for boys and girls in darts game turned out to be different - "I think the most important implication of these results is that fantasies can be very important in creating motivating instructional environments but that, unless the fantasies are carefully chosen to appeal to the target audience, they may actually make the environment less interesting rather than more." (P. 47)

"If the mere presence of feedback were the most important aspect of the success of Darts, then the difference between Conditions 1 and 2 should have been greater than any other diffferences between adjacent conditions. In fact, fantasy and music both appear to be more important that feedback in making this game appealing. But the fantasy in computer games is a unique form of responsive fantasy. The viewers of movies nad books are passive observers of the fantasies that are depicted. The players of computer games, on the other hand, are active participants in the fantasy worlds created by the games." (P. 48)

CHALLENGE

"In order for an environment to be challenging it must provide goals whose attainment is uncertain.... at least four general ways that the attainment of a goal can be made uncertain for a wide range of people or for the same person at different times: 1)variable difficulty level; 2)multiple level goals; 3)hidden information; 4)randomness." (P.50)

"...proximal(ie. short-term) goals were significantly superior to no goals or distal (long-term) goals in sustaining performance and interest in the task." (P. 51)

"Another aspect of goals is highlighted by Csikszenthmihalyi's (1975) distinction between fixed goals and emergent goals. He defines fixed goals as those that are predetermined by cultural convention (like winning a game) while emergent goals arise out of the interaction between a person and the environment (like drawing a certain kind of picture). Csik. would claim that there should at least be easily generated emergent goals in intrinsically motivating environments. The correlational results in Study 1 suggest (though do not prove) that for these young computer game players, emergent goals like those in the story completion program and the drawing program were not as motivating as the fixed goals in games like Petball and Breakout." (P. 51)

"In either case, as people's abilities increase, the absolute difficulty level they find most challenging will also increase and therefore an intrinsically motivating environment should provide this increasing level of difficulty." (P. 54)

FANTASY

"Fantasies can make instructional environments more interesting and more educational. I define a fantasy-inducing environment as one that evokes 'mental images of things not present to the senses or within the actual experience of the person involved' (American Heritage Dictionary). These mental images can be either of physical objects (eg. darts and balloons) or of social situations (eg being the ruler of a kingdom)."(P. 56)