

An Evaluation of Compatibility Checklist based on Flow Theory for Redesigning Learning Environments

Yasuhisa Kato
ykato@st.gsis.kumamoto-u.ac.jp
Graduate School of Instructional
Systems Kumamoto University
Kumamoto, Japan
NTT Learning Systems Corporation
Tokyo, Japan

Katsuaki Suzuki
Graduate School of Instructional
Systems Kumamoto University
Kumamoto, Japan

ABSTRACT

This paper shows the plan of the formative evaluation to confirm the validity of the checklist, which could check the compatibility with flow theory, and could be applied in educational areas, such as classroom teaching, e-learning, etc. A formative evaluation includes the identification of the credibility of the checklist with given course materials. The checklist could be proved to be very valid because most instructional designers and instructors give almost the same scores of the compatibility with each checklist item and their standard deviation is relatively small.

Keywords: *Flow Theory, Learning Environment, E-learning, Design Approach*

INTRODUCTION

In K-12 education, there are less Japanese students who have affection for mathematics and science than the global average (Olson, Martin & Mullis, 2008). In higher education, the dropout rate in e-learning courses is higher than that in on-campus usual courses (Xenos, Pierrakeas & Pintelas, 2002). One of the main reasons for those phenomena is a lack of motivation. There are many motivational issues in real educational settings. Many problems are expected to be solved with enhancing teachers' and students' motivation to teach and learn. Our purpose of this research is to provide one solution to enhance motivational design in learning environments, especially in e-learning settings.

When people are very concentrated on some tasks and they forget time and enjoy them by themselves, they might get in optimal experiences, so called, flow state (Csikszentmihalyi, 1975). Recently, much research about flow experience has been done in various fields, such as psychology, business administration and education, etc. Flow theory has shown some potential of improving and enhancing motivational design in e-learning environments (Rossin, et al., 2009). Csikszentmihalyi (1997) has described flow experience as a magnet for learning because sustainable flow experience requires new levels of challenges and skills. Therefore, flow theory can be an effective approach for constantly motivating.

Therefore, we proposed an approach for redesigning learning environments with flow theory and developed a checklist for compatibility with flow theory (Kato & Suzuki, 2011). This checklist is targeted for classroom teachers as well as courseware designers, whose experience varies from novice to expert. We conducted the initial formative evaluation, so participants checked their own teaching environments or courseware with fifteen checklist items. We found that the checklist can cover a wider variety of subject matters and it has some potential for users to acquire new perspectives for their redesign activities.

In this paper, we will conduct further formative evaluation from the different view point. The purpose of this evaluation is to verify the validity of this checklist by teachers or designers in order to

update our framework and improve our prototype system. The formative evaluation is that instructors and course designers check the same given course materials with the checklist.

FLOW-BASED REDESIGN

We proposed a flow-theory-based redesigning process and an online portal site as its implementation (Kato & Suzuki, 2011). This framework is targeted for teachers and course designers and aims to provide them hints and suggestions, which are derived from flow-theory-based checklist, to improve their teaching and learning environment, and to increase and enhance their motivation. There are four major processes in the framework:

- Check with Checklist
- Propose Improvement
- Perform Active Experimentation and Get Concrete Experiences

Three main contents are provided in the portal site:

- Database on Redesign Practices
- Introductory Course on Flow Theory
- Database on Flow Experiences

In this paper, we focus on the validity of the checklist. We will clarify that the checklist items in the checklist could help users to find appropriate improvement issues in the specific learning environments and the course. The research question is that this checklist could be relatively robust and applied to many educational settings and each checklist item can work effectively and individual differences of participants' scores of compatibility are relatively small.

FORMATIVE EVALUATION

Participants

The participants will be 32 people. Half of them were joined the initial formative evaluation (Kato & Suzuki, 2011). Another half will be the first time to use the checklist. All participants have more than one-year-experience of teaching or designing course materials. Participants are volunteers in the educational communities of Japan, through email, twitter, or facebook.

Test Procedures

As same as the first formative evaluation (Kato & Suzuki, 2011), all participants' activities, including questionnaires, are done under the open source LMS, moodle system. Two different online courses are provided for the testing. A half participants will do one course and others do another. Each course has the embedded several parts to be improved in terms of the flow theory checklist by design. Every participant is expected to find all disadvantages of courses, which could be improved, using the checklist after finishing the controlled course materials. All participants answer the online questionnaire, which includes the effectiveness of each check item as well as open statements.

Data collection and analysis

After finishing participants' evaluation testing, each checklist item has 5-point-Likert-type scores for each course. Here are analytic point of views for the formative evaluation.

- Most participants can find the improvable points in the courses and rating scores have smaller variance. If not, individualized normalization would be applied and the validation will be checked again. If there is a significant difference, modification of the appropriate checklist item will be considered for further evaluation.
- If there is a significant difference between participant groups, analytical activities will be done for each group. A group with the first experience of the flow-based checklist is analyzed separately from the other group with the second use of the checklist. It will be three month after the first formative evaluation.
- If there is a big difference between courses, several factors may cause the results. One possibility is a subject matter difference. Two courses may have different difficulties or

checklist application is not appropriate. Another factor is a test design. It will be checked that selected checklist items are appropriate or not. If needed, modification of the appropriate checklist items will be considered.

DISCUSSION

It is found that this checklist is very valid because most instructional designers and instructors rate almost the same scores of the compatibility with each checklist item for the controlled sample course materials and its standard deviation is relatively small. If there are some big differences in results, such data will be analyzed in terms of experiences of test subjects, or checklist items, etc. Further studies, including the possibility of modifying or omitting some of checklist items, will be discussed in detail.

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