A Study on the Design Method of Micro Contents; for national R&D researcher

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Abstract: One of the hottest HRD keywords for 2018 ATD is micro-learning. Students are starting to want learning content that can be easily accessed and consumed anytime, anywhere, and they are inclined to acquire short, core quality content, either free or low-cost.
As the learning environment and learner's learning styles change, it is necessary to develop micro-content that enables productive learning through simple interaction with content that is relatively small compared to the traditional eLearning process.
The purpose of this study is to analyze learners' needs for micro-learning content and present ideas and insights for efficient content design.
Micro-learning are short, concise, and bite-sized learning content, This study is meaningful in deriving direction of contents development and operation through recognition research on micro-learning contents, and performed quantitative and qualitative research on researchers conducting national R&D.
As the results, the purpose of this study for R&D researchers to learn is to provide intuitive information and knowledge during short learning periods, with the aim of improving their own research and practical skills. In addition, the majority of researchers have learned using PCs and prefer video or info-graphic type micro-learning content (such as card news). In conclusion, we would like to discuss the direction and potential of future research on micro-learning content design.

Keywords: Micro-learning, Bite-size contents, R&D researcher learning style

INTRODUCTION

The changes in digital technology around us are hastening the era of micro-learning.

The media landscape of mobile has become a trend, and the generalization of search-oriented content consumption

The appropriate micro-learning has become a major concern for HRD. The 2018 ATD cited micro-learning as one of the key words. Last year, if I had an insight into the concept of micro-learning, I was talking about how to apply it to work and study this year.

The busy lives of modern people also make micro-learning more important. An environment that is exposed to a lot of information, exposed to a lot of connections, and rapidly changing circumstances require modern people to be familiar with multitasking, which means there is not as much time to focus on content as there is.

As the development of information and communication technologies and the expansion of infrastructure also reduced space constraints, more time was available for learning, allowing students to learn using shorter hours such as commuting time, lunch time and resting time.

However, the need for efficient use of these times has put pressure on employees who share learning and working together to learn a general regular e-Learning course that consumes relatively much physical time and money. Because there is much content to learn regular e-Learning courses in a short period of time in everyday life, the flow of learning has been interrupted or there are some difficulties in understanding it at once.

As a result, despite the willingness and enthusiasm for high learning, the course was often not completed or failed to achieve its goal. Statistics show that more than 50 percent of online classes are cancelled in adult education, and 85 percent of learners in certain areas are reported to be out of the study process before they are not conducted or are evaluated.

This shift in the educational paradigm of the period should also be considered in the design of the educational environment for adult learners, beyond conventional formalized learning types such as workshops where structured learning is conducted around specific topics and short-term collective education.

As such, there are many movements in everyday life

to solve problems through irregular learning, not through eLearning form, and productive development through very short and simple interaction with content that is relatively small(Michal kerres, 2012).

In order to improve the development and operation of micro-learning contents, prior research on the characteristics of micro-learning contents was investigated and compared with the characteristics of e-Learning contents.

In addition, it was intended to provide scientists with a way to efficiently develop and operate actual micro-learning contents by conducting demand analysis on micro-learning contents (survey and FGI). Specific studies are as follows.

First, we compared existing e-Learning content with micro-learning content to derive problems and improvements in e-Learning content and explored whether micro-learning could be an alternative.

Second, we analyzed the understanding and demand of micro-learning through the questionnaire and FGI to analyze the demand for actual micro-learning.

Finally, the possibility of applying micro-learning contents to actual independent learning and e-Learning linked learning was explored.

THEORETICAL BACKGROUND

Micro-learing

Micro-learning began in the early 1960s at Stanford University, where it developed the learning process and In accordance with the level of education and the degree to which it is reflected in the curriculum, it is tested in various ways and the contents are changed. It was part of the educational system that had been designed.

Also micro-learning was first mentioned at the Media in Transition Conference in the U.S. in 2015. It is defined as the learning process itself as well as the short unit of learning objects and content.

In 2017, ATD explained micro-learning as Bite-sized contents, which is short, concise content. that can be consumed in bite-sized pieces, the amount and content the learner can digest at once.

There are many definitions, in this study, micro-learning is defined as different types of content that deliver key knowledge in a short period of time

e-learning vs. Micro-learing

Due to rapid changes in knowledge and technology, the concept of knowledge changes rapidly, and the amount of knowledge is increasing. Also, the time gap for knowledge change is getting shorter and we are falling behind in keeping with the knowledge changes we have learned, even though we are learning to acquire knowledge(park, 2016).

Due to this phenomenon, eLearning with a relatively long time to develop content shows the limits of the timeliness of learning, and micro-learning is mentioned as an alternative to solving the problem of e-Learning. Compared to the existing e-Learning process, online content that is short and makes learning possible through simple interaction and requires easy to maintain and easy to develop (Peter A. Bruck, 2012)

Table 1. Comparison of eLearning and Micro-learning

	e-learning	**Micro-learning**
Learning Time	Relatively long learning (about 2 hours)	Relatively short learning (about 5 minutes)
Context	Theory and introduction, deep problem resolution, etc. aim for Mastering Learning	Minimum unit learning direction, including specific topics, key delivery, and simple problem resolution
Curriculum	All objects and modules combined; Type learning elements	Part of the module during the course, Non-formal learning elements
Learning design	Structured Learning(Preparation-Studying-Survey-Assessment) Flow	Object learning flow, such as segmented episodes, masses of knowledge, technical elements, etc.
The aims of the lesson	Teaching-learning activities to achieve required learning outcomes	Repetitive learning, attention, motivation, perception, integration activities
Contents Type	FLASH, HTML, Videos, etc.	Videos, Graphics, Documents, etc.
Learning Environment	Web-based	Mobile, App-based
The use of learning	Repetitive learning, self-directed learning, proactive learning of flip-learning, action learning support, etc.	

R&D Researcher's learning style

Science & Technology Personnel is directly involved in the activities of scientific technology and is usually defined as scientists, engineers, technicians

and assistants (Ko, 1997). In the scientific and human resources used by the OECD, the person who successfully completed higher education than the Ph.D. level in the field of science and technology, or who did not successfully complete higher education above the Bachelor of Science level, usually. In particular, the rapid change in industrial structure and technology requires active education and training, such as spreading or interacting with various areas across the boundaries of the dynamic field.

To counter the paradigm shift of the fourth industrial revolution, the scientific and technological workforce places great importance on knowledge at research sites and demands that knowledge of quality be used immediately in the workplace is needed.

In Korea, areas requiring advanced capabilities in the field of science and technology are expanding, and large-scale, highly educated people are fully educated and trained in the capacity they need.

The new paradigm shift should also be considered in designing an educational environment for adult learners. In particular, adult learners learn by themselves, not by external rights or coercion of others, unlike infants and young learners, and secondly, learners are self-reliant by deciding on their own initiative and not by other people's judgment or standards. Third, adult learning, based on reality, aims to solve specific reality problems and needs to be able to provide practical assistance(Lee, Kim, 2003).

METHODS

Survey

We designed an online survey for the Science & Technology Personnel to create and operate custom micro-learning content.

Recognition and experience of micro-learning(e.g. Have you ever experienced micro-learning content?, What was the inconvenience of experiencing micro-learning?), desired learning time(e.g. How long can you be immersed in micro-learning), types of content(e.g. What is the type of micro-learning content for efficient learning ; videos clips, graphics, text etc), content topics(e.g. What topics would you like to learn with micro-learning?)

We distributed the online survey to learners who had already completed e-learning courses provided by the collaborating organization. A total of 260 people completed the online survey. The collected data was analyzed by descriptive statistics to identify overall patterns and ranked orders.

Focus Group interview

The purpose of the FGI(Focus Group Interview) is to prove its validity through expert opinion in the field of science and technology in the development and operation of micro-learning content.

To this end, a single FGI was conducted, with a good understanding of the characteristics of the science & Technology personnel and three experts in charge of education and training at the scientific institution for more than 10 years.

Contents Developnet and Implementation

Content development required the selection of content types considering the learning environment, the service environment and the needs of the learners, and development was required according to the technology characteristics and level appropriate to that type.

First, the learning objects should be organized into minimum learning units, secondly, drawing topics that are applicable to the learners' needs and micro-learning. Third, in addition to the independent learning of micro-learning, the study associated with eLearning was considered.

RESULTS

Survey and Focus Group Interview

Of the 260 respondents, 180(69%) answered that they were unfamiliar with the term, but they were exposed to micro-learning in a variety of ways and ways. In particular, 90% of the people who experienced micro-learning said that micro-learning is more efficient. Eighty-eight learners (31%) said they could concentrate on learning for 10 minutes, and 128 students (49%) preferred videos.

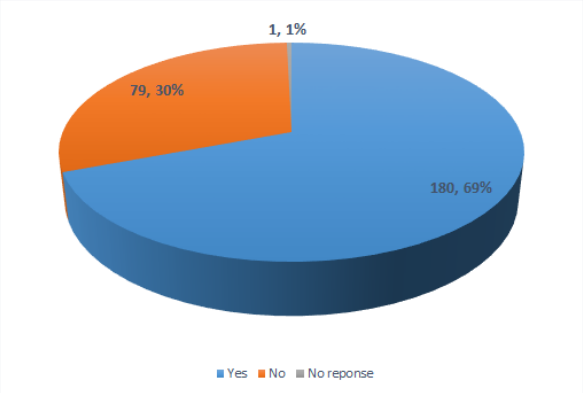

Figure1. Experience of micro-learning

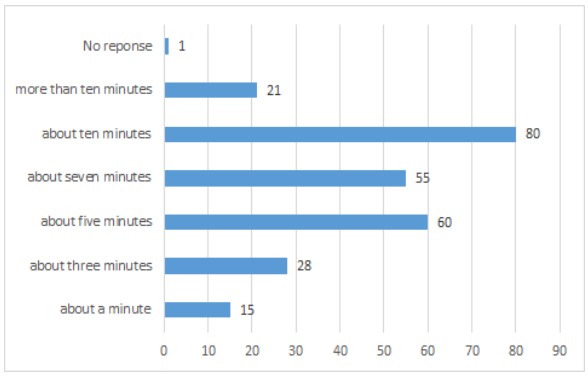

Figure 2. Flow time on learning

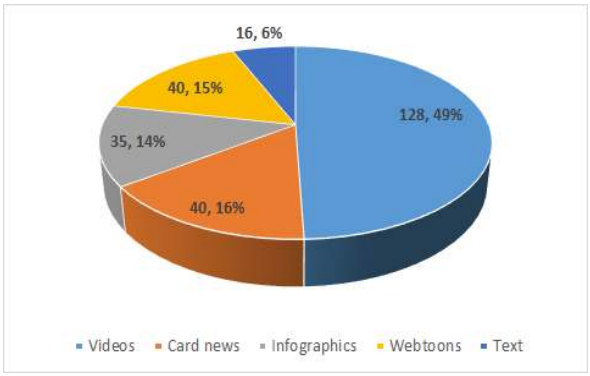

Figure 3. Preferred Contents Type

The study subjects were derived through a survey of 260 learners and an FGI of 3 experts at the scientific and scientific research institutes in relation to the subjects suitable for micro-learning. The final development topic was selected by reviewing whether the contents could be used externally by converting the number of learners' frequency and the overall scores and opinions of experts.

	Topics	Learner		Experts		Possibility to utilize external data
		N	Ranking	Score*	Ranking	
1	The latest science trend	251	1	10	1	x
2	Analyzing the latest paper in research and technology field	240	2	10	1	○
3	World trends of science and technology policy	230	3	10	1	○
4	Research tool usage and interpretation guide for R&D	220	4	9	5	x
5	A series that creates ideas for science and technology	209	5	8	4	x
6	Examples and know-hows of research results(technology transfer, patent, and business modeling)	201	6	8	7	○
7	Lectures of famous scientists and engineers	194	7	7	6	○
8	Introduction and management of experimental equipment	186	8	7	8	x
9	Success stories of laboratory companies	177	9	6	9	○
10	Interview series of female scientists and engineers	156	10	6	10	○

* Perfect score is 10

Contents Developnet and Implementation

Contents Developnet

The direction of development of micro-learning content has changed the existing e-Learning design and development process. Subjects were selected through the student and experts requirements analysis.

Through this survey, we did not develop contents that can be used by introducing data from outside in order to develop content that is essential.

Among the top five developed contents, The latest science & Technology trend, analyzing the latest paper in research and technology field, A series that creates ideas for science and technology topic were finally selected.

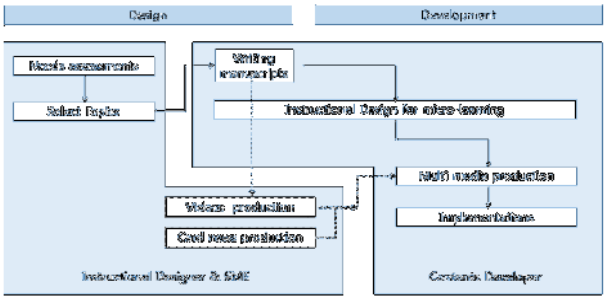

Figure 4. Development process

Also, content design applied micro-learning design techniques.

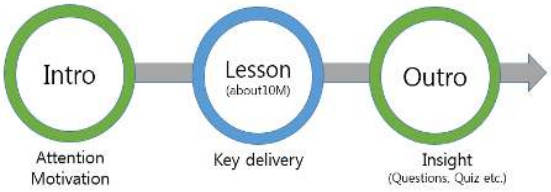

Figure 5. Contents Frame

The direction of development of micro-learning content has changed the existing eLearning design and development process. Subjects were selected through the student requirements analysis and content design applied micro-learning design techniques.

Implementation

The developed micro-learning content was used in two ways. First, the Commission provided a curation service to enable independent study of objects. Second, the micro-learning contents related to eLearning topic were linked to the learning player to enable secondary learning.

Figure 6. Contents Curation Service for Independent learning

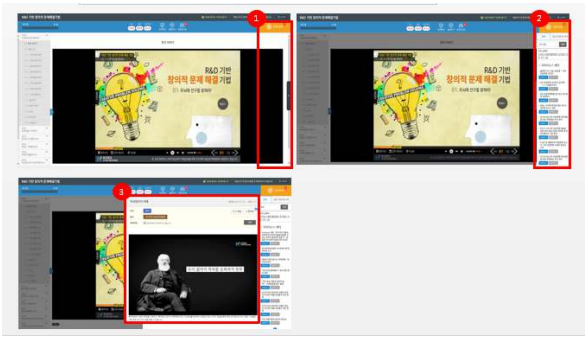

Figure 7. Support for e-Learning Linked Learning

DISCUSSION & CONCLUSION

In this study, we attempted to analyze the learners' needs for microlearning, develop and apply content to improve the changing types of content as the learning environment changes and problems derived from existing e-Learning.

We developed micro-learning contents to derive learning time and content types that reflect learners' opinions, to complete learning in a short period of time, and explored alternative possibilities, learning links, and methods of utilization of eLearning.

In the future, changes to a relatively smaller learning unit will be made in developing content, more applications will be produced and further studies on the effectiveness of microlearning will be needed.

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