User Comments to Video Instructions: the Effects of Kanmaku on Usability, Motivation and Self-Efficacy

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Abstract

Purpose: Kanmaku refers to displaying comments in videos, which gives those helpful messages hidden in comments a better chance to be seen by users. The purpose of this research is to find out kanmaku's influence on usability, motivation and self-efficacy, compared to traditional comments and no comments.

Method: Sixty college students volunteered in this study. Participants were divided into three groups, each operated with video instructions with no comments, traditional comments or kanmaku. They were asked to finish a task, a questionnaire and a retention test.

Results: Figure indicates that on effectiveness, efficiency and satisfaction, no significant difference were found among three groups. However, on self-efficacy, kanmaku yielded significantly better results. And on motivation in general, traditional comments worked better significantly.

Conclusion: This research shows that on self-efficacy, kanmaku has the biggest advantage. Meanwhile, on attention, kanmaku performed the worst. Further studies need to be conducted on kanmaku with more other features.

Keywords: instructions; video instruction; comments; kanmaku

1. Introduction

Kanmaku is probably a strange word. Actually it is not an English word at all. Kanmaku is a Japanese word which refers to the live comments, which are created by users, flying over the screen. This word is a military term which can be translated as “barrage” literally. Because of the similarity of comments flying over the screen to flying bullets (Figure 1), “kanmaku” was chosen as its name. In a kanmaku system, the comments users create will be immediately shown on the screen. Essentially, kanmaku are comments. However, compared to traditional comments, the switch of display method gives different features and influence on viewers. It can be used on website, but is mostly used on videos. Due to its popularity among young people in the animation world, it has already brought huge change to video platforms. Now nearly all main Chinese video website offer this function, though most Chinese kanmaku users still go to kanmaku webs, such as bilibili.com and acfun.tv.

Figure 1 Kanmaku: flying comments in videos

Nowadays kanmaku is still mainly used for videos which are for entertainment purposes, such as fan-made videos, movies or TV dramas. As kanmaku becomes popular, new videos for other ends gradually emerge on these platforms, including tutorials. Take bilibili.com for example, which is the mostly used kanmaku website in mainland China, “technology” is one of its first-level categories. Under that tag, there are documentary, popular science, instructions, speeches/open classes, military,

digital device and machines as its sub-categories. The videos cover TED talks, trial of digital products and plenty of other fields. Tutorials are also abundant, such as courses for language, painting, handwork, and even instructions on how to build some useful mechanic gadgets or how to repair your car. However, the kanmaku world is still ruled by entertainment videos.

A breakthrough was that, not a long time ago, a tutorial for the C programming language appeared in this zone for most popular videos. Its first episode attracted more than 150,000 viewers and yielded over 5000 comments, and this number only refers to those that viewers can see now. Follow up, the figure for the second one is not that beautiful but still has over 30,000 viewers. Though these kanmaku surges at the beginning, they actually run through the whole video, which means many viewers did finish watching. This is actually the inspiration of this research. Kanmaku has motivated people to spontaneously watch a tutorial, which is not only less entertaining than other videos, but also about some relatively complicated knowledge. The content itself may not be interesting, but along with kanmaku, it may become more attractive. In the comments, some users admitted that it was the willing to read kanmaku to a technology tutorial that brought them here. However, we do not always get to know things because we are formally taught. On the contrary, we meet many of them by coincidence. For this video at least, kanmaku has brought the C language to more people, and who knows if any of them would become a programmer only because of this coincidental glimpse on it?

However, this is only one example. Is this result some coincidence that is due to very special reasons or a corollary of using kanmaku? What are the impacts of kanmaku on usability, user motivation and self-efficacy, compared to traditional comments and no comments? This research will scientifically study these questions.

2. Theoretical background

2.1. Previous research on instructions

Instruction refers to a statement that describes how to do something (Merriam-Webster). Instructions plays a very important role in teaching and instructing people.

Van der Meij, Karreman & Steehouder (2009) studied the development of software tutorials.

Printed software tutorial experienced three phrases of development. Software tutorial firstly appeared in the first decade, namely 1980-1990. Early instructions were expository and paragraph-structured. Different types of information was used, but not visibly discriminated from each other or clearly labeled. Later in this decade, many researchers suggested step-by-step tutorial, such as using a list of numbered steps (as cited in Van der Meij, Karreman & Steehouder, 2009), and "cookbook style" suggested by Houghton-Alico (as cited in Van der Meij, Karreman & Steehouder, 2009) and Simpson and Casey (as cited in Van der Meij, Karreman & Steehouder, 2009). Robert Horn's (as cited in Van der Meij, Karreman & Steehouder, 2009) "Information Mapping", which was also formulated in the 1980s, strongly influenced the development of the current writing style. The early minimalism approach also appeared in this period.

In the decade from 1990 to 2000, a typical software instruction starts with a brief description on the goal. Following up is procedural information structured in steps. Conceptual information and screen captures were also used. In this decade, procedural and declarative information was introduced and discussed. Support for handling error also appeared (Lazonder & van der Meij, 1995). Tutorials started to invite users to explore by themselves (as cited in Van der Meij, Karreman & Steehouder, 2009).

From 2000, user experience has becoming a vital aspect of tutorial. Users' emotion has been brought into consideration. Virtual agents were hired to enhance users' motivation to user instructions. Many motivational elements, such as attention, relevance, confidence and satisfaction (ARCS) were also introduced (Keller, 1987).

2.2. Previous research on declarative information

Declarative information refers to all information except those about "the actions that must be executed while working with the product" (Karreman, Ummelen & Steehouder, 2005). It is a consensus that in an instruction, procedural information is always the core part (Karreman, Ummelen & Steehouder, 2005). However, declarative messages are also useful.

Kieras and Bovair (1984) conducted and experiment in which participants were asked to operate a device. They separated participants into two groups, one only learned the procedures and the other one also learnt how-it-work knowledge. Tests showed that the second group yielded less

error and better efficiency.

Ummelen (as cited in Karreman, Ummelen & Steehouder, 2005) did a series of experiments in order to figure out if users read declarative information by the click and read method. Participants were asked to click on either procedural or declarative text box to read them. The total legible time of each block was calculated as the time participants spent on each type of information. Data indicated that participants spent approximately 35% of the total time on declarative information.

Karreman (as cited in Karreman, Ummelen & Steehouder, 2005) also conducted an experiment in which she measured the reading times of declarative messages by using the click and read method. Procedural and declarative text blocks were presented, and participants were allowed to decide which block to read while operating the given device. Results showed that participants spent 20% - 25% of the total time on declarative information, which supported the idea that users spontaneously read declarative information, even when they can skip it.

Karreman and Steehouder's (2004) experiments with instructions with or without system information showed that system information fastened "performance for correctly completed tasks".

Researchers also studied how users use declarative information. Karreman (as cited in Karreman, Ummelen & Steehouder, 2005) carried out an experiment in which they found that users preferred to use declarative information in two ways. One is to spend some time on it before performing the task, and the other one is to consult it during operating.

By studying relevant works, Eiriksdottir and Catrambone (2011) found that principles, which is the most important type of declarative information, explain to users how "a system is constructed and works and the cause-and-effect mechanisms". Though not directly helpful for the completion of a task, principles help users "build a more comprehensive understanding or mental representation of a system", which are more commonly called mental models. They are not necessarily helpful for an initial performance, but beneficial for learning and transferring.

The abovementioned studies show that users like declarative information. Declarative information also enhance the effect of instructions. The mental models which are built with the help of declarative information, may give users better understanding about the task and make they feel more controllable over the task, thus increase their self-efficacy.

2.3. Previous research on motivational elements

The ultimate goal of instructions is always for the users to have better performance, finishing a certain task with less error and time while feeling more satisfied. Different strategies have been taken in order to get closer to this goal, among which, motivational elements have been proved useful. Motivational elements refers to those which "increase attention relevance, confidence and satisfaction". The idea is from Keller's (1987) studies where he claimed that motivation to learn would be enhance by increasing the four aspects.

Loorbach, Karreman and Steehouder (2007a) did an experiment in which they found that in the case of paper-based instructions used by students in a reading-to-do setting, motivational elements have positive effects on user's satisfaction, whereas for seniors, motivational elements focusing on relevance and confidence increased participants' effectiveness of task performance. The confidence elements here also positively influence users' persistence.

In another study, Loorbach, Karreman and Steehouder (2007b) used Keller's ARCS Model of Motivational Design, namely Attention (A), Relevance (R), Confidence (C) and Satisfaction (S), to design motivational elements in instructions. Methods are to use color and bold to underline different parts of the instruction and colloquial sayings in Attention version, to maintain user' attention; brief summaries of every section, lexical marking, plain words instead of terms and narratives in the Relevance version, to relate the instructions to users' personal needs or goals; brief summary of every section, encouraging words, "Order of reading" and verification steps in the Confidence version, to enhance users' confidence in their ability. Result showed that motivational elements does make differences in user performance. Both Relevance and Confidence yielded better outcome, with more participants correctly performing the task, though the Attention version did not show significant influence on users. Besides, the study's outcome also indicated that user persistency was also increased in the Confidence group.

2.4. Previous research on video instruction

Paper-based tutorials have always been dominant in the tutorial world. However, since the development of technology, such as more powerful and faster internet, video is increasingly

challenging this dominance, as technological barriers to its production and distribution have been removed. (van der Meij & van der Meij, 2014) Following YouTube, specialized websites with "how to" videos also came up. Academia also made a lot of efforts in order to figure out if video is a better way to instruct users to complete a task.

Van der Meij and van der Meij (2014) concluded that a video presents information in multiple modalities, which, according to dual coding theory (Clark & Paivio, 1991), enhances the effect of message delivery, with auditory and visual information strengthening each other. Besides, congruence exists between the screen capture animation and real-life task execution (Tversky, Bauer-Morrison & Betrancourt, 2002). A video tutorial shows a task sequence, which is essentially different from static pictures. It demonstrates not only movements, but also the context of these movements. All the changes in a video are exactly the same as what users see in their own processes. Furthermore, video provides an "easy-to-follow model", which enables user to learn by mimicking observed actions.

Other than theoretical analyses, experiments were also done to test the effects of video instructions. Payne, Chesworth and Hill (1992) conducted an experiment in which they asked participants to follow instructions to learn how to use MacDraw for drawing, moving and deleting figures on the Macintosh. Participants were separated into four groups, each with no instructions (control), paper instructions, video instructions or both paper and video instructions. Results showed that video instructions worked as well as paper-based ones.

Palmiter and Elkerton (1993) conducted an experiment in with participants learned how to use HyperCard with three types of instructions: paper without screenshots, video without narration or video with narration. Results showed that participants using videos completed the training significantly faster and more accurate, compared with those using paper tutorials.

Lloyd and Robertson (2012) conducted two consecutive studies in which they asked students to learn to enter data and perform a t-test in SPSS with a paper-based tutorial with screenshots or a 12 minutes video with narration. In the first study, they found that students using the video instructions significantly worked better in post-test, finishing more tasks in a shorter time. In the second study, students were allowed to use more time and review the tutorial during the test. The results this time showed that student with video still had advantage over the other group on the number of tasks finished, but no longer on time using.

In a recent study, van der Meij and van der Meij (2014) asked students to learn Word's formatting. Four types of materials were used: Paper-base, Mixed A (paper-based preview and video procedure), Mixed B (video preview and paper-based procedure), and Video. The experiment consisted of a pre-test, which tested participants' performance before training, a training part and a post-test, which tested their performance after training. Results indicated that from pre-test to training, the improvement of participants in the Mixed A, Mixed B and Video group significantly outperformed those in the paper-based group. From pre-test to post-test, Mixed B and Video clearly helped participants improved more that the paper-based instructions.

The above mentioned analyses and experiments proved that video instructions can yield better results than paper-based tutorials. However, the results are not entirely conclusive. For instance, Mestre (as cited in van der Meij & van der Meij, 2014) did an experiment which showed that in recreating tasks, students using static screen shots significantly performed better than those with videos.

Ploetzner and Lowe (2012) tried to explain the heterogeneous results from studies on video instructions. They argued that it is probably because that animations are diversified too much. In the following year, van der Meij and van der Meij (2013) formulated eight guidelines for design of video instructions for software training, aiming to regulate video-tutorial developing.

Summarizing, video has attracted the attention of instruction producers, becoming an irreversible trend of instruction presentation method. Besides the video itself, user's comments which always come along with videos also play a helpful role for learning.

2.5. Previous research on online community

Nowadays, almost all video platforms support comments and responds to comments. With such functions, users can actively interact with the uploader of the video as well as other users who post comments. In his research on the participation frame work underlying YouTube interaction, Dynel (2014) found that the extended participatory framework for YouTube consists of three different level of communication: the level of the speaker and hearers in video interaction, the level of the sender and the recipient of a YouTube video, and the level of YouTube speakers and hearers who post and read comments, respectively. In these communication levels, participants are the production crew

and YouTube users, yet their roles changes when they are in a different levels. Bou-Franch, Lorenzo-Dus and Blitvich (2012) described that computer-mediated communication (CMC) can be devided into three types: one-to-one communication, one-to-many communication and intergroup discussions, and YouTube participation structure encompasses the latter two. The communication between the uploader and all users who watch the video is a one-to-many communication; and all the comments and discussion in comments zone is intergroup communication, for all users are both speakers and listeners. Compare these two types of communication to learning process of some instruction, users watching a video is like a teacher giving a lesson to students, while users writing comments or arguing on some topic is like students discussing in class. Users who are fond of the videos pertaining the same field and actively comment on these videos, a comparatively tight, community-like relation is likely to be formed.

For some researchers, YouTube has already formed some kind of community, with its supports for social-networking-like interaction. In Boyd and Ellison's (2007) research, they argued that sites like YouTube are initiated as media sharing platforms but end up with a number of social networking features, such as rating commenting videos as well as comments, likes, friending and subscription, becoming social networking stites (SNSs) themselves. Paolillo (2008) sees YouTube as "a social networking site, with the added feature of hosting video content". (as cited in Lindgren, 2012) Lindgren (2012) thinks that "YouTube is surely a social media site, rather than a mere video repository". While Rotman and Preece (2010) further described YouTube-like broadcasting platforms as a community, with subgroups as sub-community, enabling users to form closer relationships.

The videos on the platform offers a topic which intrigues the formation of a small but intimate community, where users actively argue about some content in the video, generally talk on this topic and sometime broaden it. If the videos are about news, the community consists of people with insight, analyzing what the facts reveal; for movies or TV dramas related videos, the communities are funs, discussing some details about the clips. When the videos are instructions, teaching people how to perform repair, or make some interesting gadgets, the community can be very aspirant. It is a learning group. People comment if the instructions are clear enough, or give feedback about whether they succeeded or not, or which step of the whole procedure should be paid special attention to. Some users are so diligent that their comments, with procedural, declarative or motivational

information included, can almost function as complement to the instructions in video (Van Ittersum, 2014). They are like co-workers to each other. And studies show that compared to teachers, co-workers' words more easily understand (Frasson & A ïmeur, 1997). Though no face-to-face interaction exists, the platform makes sure that their thoughts are correctly delivered. Due to its openness and durability, such platforms offer the possibility to have further contact, enabling co-working relationship between some members of the community to spread from a single video to multiple videos, and to switch from coincidental to stationary.

3. Description of kanmaku

All analyses in this part are based on bilibili.com.

3.1. Features of kanmaku

With the different way of being displayed from traditional comments, in videos instead of aside them, new features come along.

Display

Kanmaku cannot be presented in an unlimited comment list, but in a video. The video screen is its limitation, as well as its benefit.

a) Rolling and fixed

In a kanmaku system, comments are not quietly staying in a box forever, instead, they move, and appear and disappear at designated moment. Usually kanmaku has two states, scrolling over the screen or fixed at some point of the screen for a while then fade away. In quick settings, users only have limited choices, while in advance settings, more things are allowed to be customized, such as timeslot (for scrolling comments, timeslot also determine their moving speed), fading opacity and exact position. For all comment are linked with their own time node in the video, they can be paused, continued, fast forward and backward along with the video.

b) Colour

In a traditional comments system, colours are rarely seen, for most of the comments are folded

anyway. In a kanmaku system, however, not a single comment is hidden. Users are allowed to custom their kanmaku. Colour, font and font size are all changeable. When users want their comments to stand out, they choose a special outlook for their texts. However, comments in a different font or size are not as many as in diverse colours. This is probably because that the differences among both fonts and sizes are not as significant as those between colours.

Sometimes some users of a video write comments in high quality, like explanation or supplementary knowledge, they intend to unify all their own qualified comments.

Content

In traditional comments system, comments are shown below or beside the video. When people make comments, they usually comment on the whole video. If they want to say something about some specific content, they need to clarify which part they are commenting on.

In a kanmaku system, things are a lot different. Whenever users want to make comments, the only thing they need to do is just to write it down. Because all comments are hooked with time nodes, they only appear when the video plays to that special time. This feature may save the formulation about what it comments on, as well as users' time and energy.

However, the convenience of the making of comments may also lead to controversial results. For instance, more comments would come up. Especially for popular videos, many comments may bring even more comments. Besides, meaningless but funny comments, such as "233333333 (means laughing in Chines network culture)", would generate a lot of similar comments. Some comments that resonate with other users may also be repeated. Therefore it is very common to see a lot similar comments in a video.

Filter

All comments are shown in videos, however, the limitation of the size of the screen makes it inevitable that only limited number of comments can be displayed clearly. When comments are not too many, they can quietly stay one by one. But sometimes videos, especially those popular ones, received too many comments that they would cover each other, sometimes even the whole screen.

Thus in a kanmaku system, users are authorized to filter comments they do not want to see.

Criteria are diverse, such as their positions, colours, how they move, keywords and their sources, etc.

Management

Like traditional comments, users can also report inappropriate comments, like rude ones, or those that insult other people maliciously. Managers will remove these comments correspondently. An exceptional thing in a kanmaku system is that when the number of comments reaches a certain quantity, all comments will be clear up. This is probably because a huge amount of comments will terribly bring down the viewing experience and it also means that this video clip is indeed popular, and new comments will quickly show up.

3.2. Categories of kanmaku

Comments in a kanmaku system can be roughly categorized into four types: irrelevant comments, motivational comments, correction of the video and declarative comments, according to their contents.

Declarative comments

Many users are very warm-hearted. They write down explanations when the video only give a conclusion, or complementary information when they think the video does not explain something clearly. Maybe it is only because they want to show off, however, the result is that such declarative comments may make video instructions more understandable and accessible. Different from the declarative information in an instruction which is systematic, declarative comments are in pieces and spread through the whole video.

Motivational comments

As above mentioned, motivational elements has three sub-types: attention, confidence and relevance.

Some comments are expressed in a funny way. They may refresh viewers especially after a

long time watching and drive users' attention back to the video. Such comments can be considered as attention elements.

Some users complain about how hard the task is or that they think they will never make it. Other users respond to them and encourage them. Other users see this would also be encouraged. Such comments can be regarded as confidence elements.

Some former viewers come back to the video and write down how this instruction help them. Such information may clarify the goal and what users could gain besides only knowing how to perform the task. Such comments can be seen as relevance elements.

Correction of the video

For many videos are self-made, it should not be a surprise is they have mistaken. Their producers should not be blamed, since they are not professional, but corrections should be made. Such information also exist in kanmaku comments.

Irrelevant comments

In a kanmaku system, many comments are only for fun. Sometimes users make fun of the video or other users' comments. They also post the date on which they watched the video, or the place they are from or currently living in. These things are not related to the video and usually not helpful for learning. However, for example, when some user is sleepy, if he/she see his/her hometown in the comments, it is also possible that he/she will be energetic again. If such things happen, these comments can also be seen as motivational comments (attention).

4. Possible effects of kanmaku on users

4.1. Usability

Usability refers to "Extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use." (ISO, 1998)

Kanmaku being displayed in the video may increase the usage rate of comments, for all of them are shown to users, instead of most comments being folded up. Even user deliberately ignore the flying texts and focus on the video alone, comments would probably still have better chance to be seen. A glance of them may lead to the memorizing of something subconsciously, which will possibly bring the users back when they are in need. Users will benefit from the timely help from comments, correcting errors in time, hence less error in their final work. Declarative comments will also give them better understanding of the instructions. Due to these advantages, it is possible that user performance in a kanmaku system will have better effectiveness: higher completion rate and accuracy. For videos are played with comments, if any comment attracted users' attention, it may act as an anchor which helps them remember the piece of content that the comment came along with, thus enhance their memorization. So kanmaku may also yield a better result if users are asked to repeat a task some time later.

Judging from common sense, timely help should lead to higher efficiency, for answers in the comments with corresponding video clip may save users time to looking for help or racking their brains for solutions. However, for simple instructions, external help may not be necessary. Users who read comments, no matter how knowledgeable they are, would spend more time than people who do not. From the perspective of the completion of task only, using more time means less efficient. Thus it is pretty hard to predict kanmaku's effect on efficiency. The best assumption would be that for comparatively difficult tasks, kanmaku would probably higher users' efficiency, and for easy ones the other way around.

For satisfaction, kanmaku is probably in the dry tree. Despite all the convenience kanmaku may offer, showing comments in video is would still be risky. Too much information coming up at the same time is possibly a burden for cognition. The flying texts could be disturbance, especially for new users, let alone they cover some part of the demonstration, and god knows if it happens to be the key part.

4.2. Motivation

When watching a video with kanmaku, users may feel like that they are accompanied. Users would learn with other users. Funny things appearing in a glance of the comments may also trigger

more interest in the instruction. The feeling of learning together and the motivational comments, would make it possible that kanmaku brings more motivation to users. What's more, if users sharing similar preference for instructions, online communities may come into being, which will trigger greater motivation. However, kanmaku's influence on each component of motivation, namely attention, relevance, confidence and satisfaction (Keller, 1987), may be complex.

As formulated in theoretical part, attention means to attract users' attention. However, kanmaku maybe have run too far on this. It is possible that some contents in kanmaku may lure users' attention back on the materials, but instead of the instruction, kanmaku may attract the attention to itself. If users cannot eliminate the influence of kanmaku, they may neglect information from the video instructions, which is more valuable.

On relevance however, kanmaku may have a comparatively positive impact. Kanmaku may present more messages in front of users, there is a better chance that users read others' feedback than find more relation between the task they need to do and the thing that they have done or they already know.

As to confidence, addition information created by other users, which pertains to the task, may give users more confidence and better control over the task. With such messages, users may fell less uncertain, which is helpful to enhance users' faith in themselves.

On satisfaction however, it is almost predictable that users, especially new users, would feel uncomfortable with kanmaku, for the overload of information may exaggerate cognitive load (Niculescu & Nijholt, 2009) and the flying text may distract users' attention. Yet it is hard to tell whether the abovementioned positive effect kanmaku may have can trade off this negative influence.

4.3. Self-efficacy

Corrections and declarative comments helps user better understand and follow the instructions (Eiriksdottir & Catrambone, 2011). Instead of looking for useful message in the whole comment list in a traditional comments system, users only need to replay the video clip where they have problems, for in a kanmaku system, comments only appear when the demonstration goes to the corresponding step. If the solutions that users need exist, they would find them there. If no solutions are found, they can post a comment to ask. Next time they play to this time node, it is very likely that they can

see the answer. The convenience of looking for solutions and the two types of comments mentioned at the beginning of this paragraph, would possibly give user more sense of control and better understanding on the tasks, thus may enhance their confidence in themselves.

However, the assumptions above are only based on common sense. To examine the real effect kanmaku has on users of video instructions, research questions are promoted.

4.4. Research questions:

1. What are the effects of kanmaku, compared to traditional comments and no comments on usability:
    a) What are the effects of kanmaku, compared to traditional comments and no comments on effectiveness?
    b) What are the effects of kanmaku, compared to traditional comments and no comments on efficiency?
    c) What are the effects of kanmaku, compared to traditional comments and no comments on satisfaction?
2. What are the effects of kanmaku, compared to traditional comments and no comments on users' motivation?
3. What are the effects of kanmaku, compared to traditional comments and no comments on users' self-efficacy?

5. Methodology

To answer the questions, a quantitative experiment was conducted. In this section, I will start up with the design of the study, and then how the materials were prepared, with the pre-test result and description on participants. Following up, elaboration on the measurements of this research will be introduced. The final part of this section is an introduction of data analysis.

5.1. Design

Qualitative experiment was chosen for it allowed me to collect real data and measure the actual

effects kanmaku had on users, thus testing the hypothesis properly. With this approach, I could control the variable factors. By manipulating variable in materials, results caused by kanmaku would be revealed.

To measure the influences kanmaku has on users, three groups were used in the experiment: control group, traditional comments group and kanmaku group, each with different materials.

5.2. Procedure

Before the experiments started, participants were asked to sign the Informed Consent Form and read the introduction of this experiment.

The experiment contained three parts.

The first part was to create a logo (Figure 2) under the guidance of the video tutorial. Participants were allowed to pause, fast forward or rewind the video, as well as playing it for multiple times. This part lasted 30 minutes at most. The time limit was not informed to participants in order not to tense them up. If they did not finish within 30 minutes, they would be stopped and taken as “unfinished”

Figure 2: Logo in the task

The second part was a questionnaire. The estimated time needed was 5-10 minutes. The questionnaire was meant to measure motivation and satisfaction, as well as creating some time between the first and third part of the experiment.

The third part was a retention test. Participants were required to repeat the task they did in the

first part, but without the help of the video this time. The time limit was 15 minutes. As in the first part, participants were not told of the limit either. And if they did not finish within 15 minutes, they would be stopped.

During the experiment, participants were allowed to ask question. But only those which were not contained in the video were answered. They were also allow to give up. But such result would be taken as “unfinished” and the time they used would not be analyzed in efficiency test.

The whole process was screen-shot.

5.3. Materials

The materials for this experiment consisted of an instructional video and comments for it. The video was a tutorial for creating a logo with Adobe Illustrator, downloaded from YouTube.com (https://www.youtube.com/watch?v=JMpq4bA3Pns).

The comments for the video were created by the experimenter, simulating to be from real users. The comments had 60 items in total, covering all declarative, motivational, corrective and irrelevant comments. Some of them were organized as conversations. (Appendix I) All types of comments were mixed up when they went to the participants.

A questionnaire was used to tester users’ perceived experience, satisfaction and self-efficacy, with 21 multiple choice questions and an open question (Appendix V). The scale for motivation was an adapted Revised Instructional Materials Motivation Survey (RIMMS) (Loorbach, Karreman & Steehouder, 2013), which measured experience from four aspects: relevance, confidence, attention and satisfaction. Self-efficacy was tested with four Likert-scale question which asks them if they were confident in finishing three subtasks which were contained in the task they were required to do, and a further one which was similar to but not exactly the same with the task participants did. The scale for satisfaction was from the one Loorbach, Karreman and Steehouder (2013) used in their research.

All participants were asked to work with a laptop on which Adobe Illustrator had been pre-installed. The software for screen-recording was Camtasia.

Everything used in this experiment were in English.

Control version

The material of control version contained the video tutorial (with no comments) and the questionnaire. This was to simulate the circumstance that users only use the video to learn things. (Figure 3)

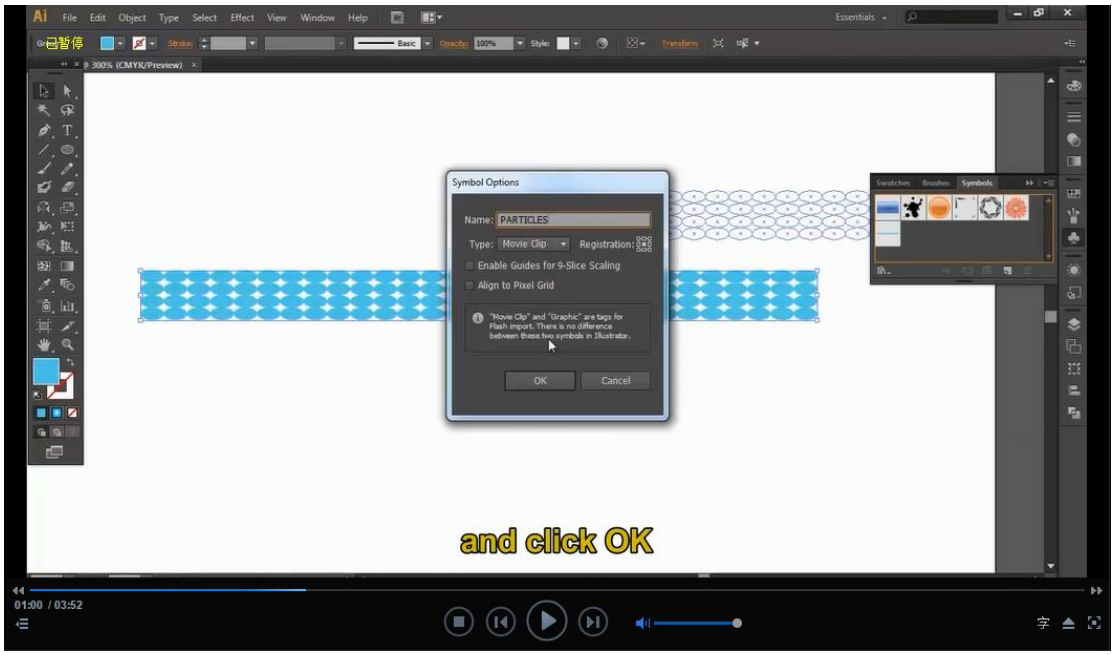

Figure 3 Control Version: no comments

Traditional comments version

The material of traditional comments version consisted of the video, comments and the questionnaire. The comments were shown in a list on the right of the video, just like how most of comments were organized now (Figure 4). On the first page, 17 comments were shown. Obviously this was to simulate how users are using videos and comments now, like on YouTube.com and most of the other online video sites.

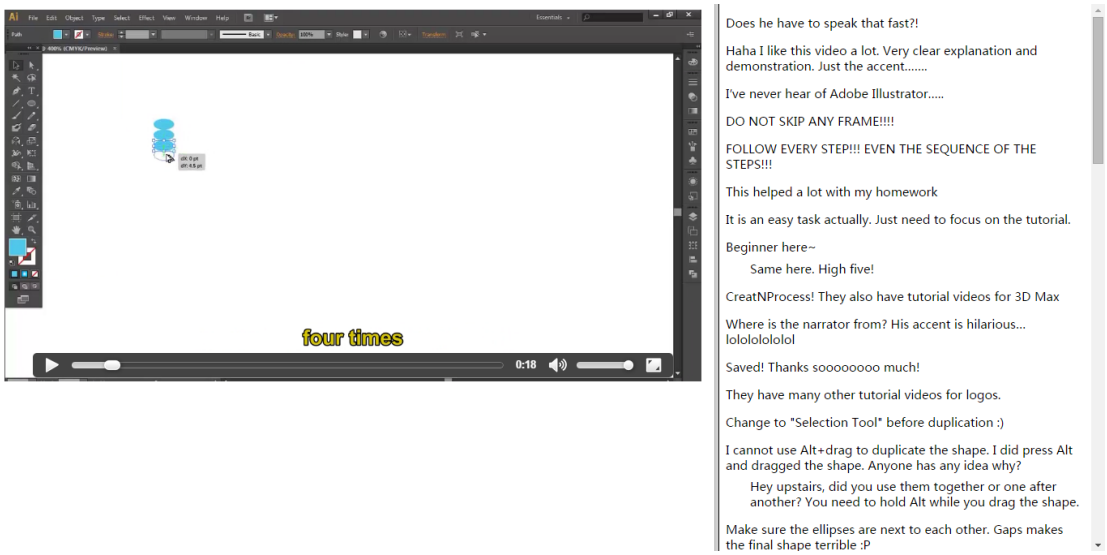

Figure 4 Traditional Comments Version: with a comment list

Kanmaku version

The material of kanmaku version consisted of a video, comments and a questionnaire, the same with the traditional comments version. The only difference was that the comments were organized in another way. Instead of quietly lying in a box aside the video, they were colored and shown in the video, with some fixed at some point and the others scrolling over. (Figure 5) Besides, for some of the comments were directly related to some part of the video, the contents were adapted. For instance, when the original comment was “In the 3D Revolve step, don’t press Enter,” “In the 3D Revolve step” was removed in this version, to make it more real.

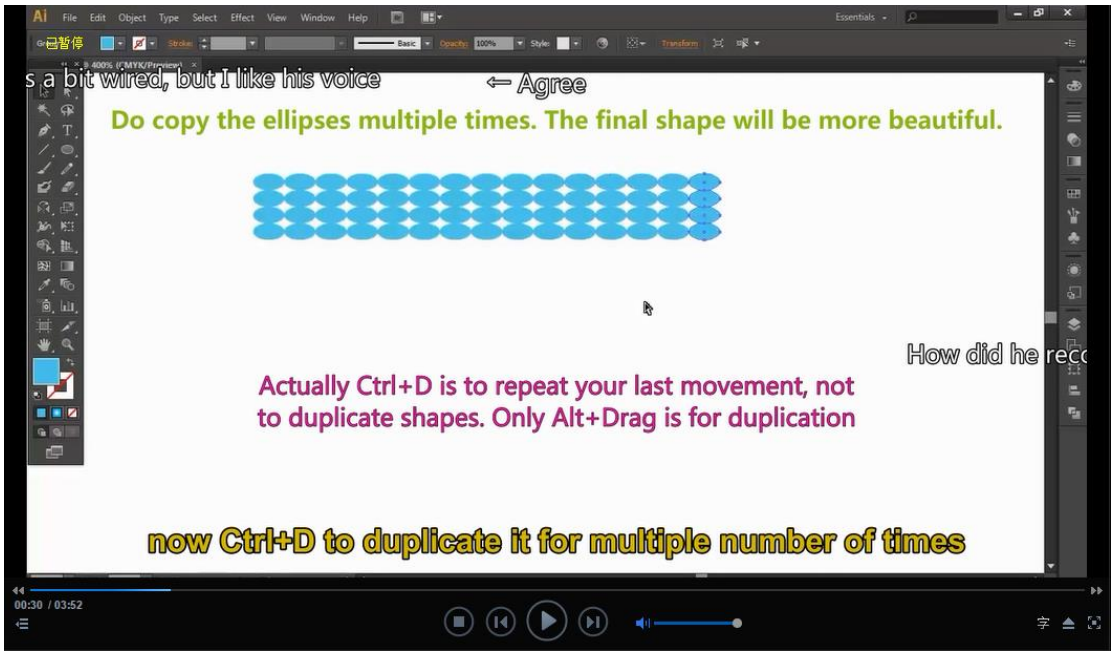

Figure 5 Kanmaku Version: with kanmaku

5.4. Pre-test

A pre-test for the first part was carried out before the experiment took place. The purpose was to make sure that the task was suitable, not too difficult that no one could finish, or too easy that everyone could finish. The material used in pre-test was the video tutorial with no comments.

Five students participated, 3 female Chinese students (aged around 24), 1 female and 1 male European student (both aged around 20). Among them, 1 female Chinese student finished in 26 minutes and 1 female European student in 27 minutes. All the others failed. This result proved that the task is appropriate.

One thing that needs to be explained is that because the pre-test had nothing to do with kanmaku, Chinese students were used here.

5.5. Participants

Sixty students participated in this experiments, among which 21 people are female and 39 people are male. Their average age is 23.55, with the youngest is 19 and the oldest is 31. The control group has 14 male and 6 female participants. Their average age is 23.1, ranged from 19 to 29. The numbers of male and female participants in the traditional comments group is 12 and 8. The average age is 24.3, range from 19 to 31. In the kanmaku group, 13 male and 7 female participants were used. Their average age is 23.25, with the youngest 20 and the oldest 29. Most of them were voluntary students from University of Twente and some were from Saxion University of Applied Science, with no remuneration. All of them were either master or bachelor students from diversified fields of studies. The selection criteria was that all participants should not have any experience with kanmaku or 3D Revolve function in Adobe Illustrator. Though according to the criteria, it was not necessary to exclude Chinese students, their participation were deliberately avoided, considering their familiarization with kanmaku. The experiment had been approved by the research ethics committee of University of Twente. Each participant was required to sign an Informed Consent Form before the experiment for permission of screen-recording of their motions.

5.6. Measurements

Effectiveness—effectiveness contains three parts: completion rate of the first task, accuracy and performance in retention test. Completion rate contains two dimensions: finish or not, and steps they finished. Performance in retention test has three dimensions: completion rate, accuracy and efficiency. The data collected are the same as those for the first task. The description on efficiency will be elaborate in the following part for efficiency.

Measurements for effectiveness:

Finish or not (for both the first task and retention test): if participants finished the first task within 30 minute, it was count as "finished", otherwise as "unfinished"; for the retention test, finishing within 15 minutes was "finished", or it was "unfinished". People who gave up were also count as "unfinished".

Steps finished (for both the first task and retention test): the number of the steps participants finished were recorded. The whole task was separated into 5 steps:

1) Create an ellipse and duplicate it multiple number of times.
2) Convert the shape into a symbol.
3) 3D revolve.
4) Expand appearance.
5) Final stroke of the "N" shape and adjust it.

Score (for both the first task and retention test): the evaluation for the final work had three dimensions, 1 score for each. Adding them up, final score was obtained. For the former two, the right results had to be created with the same methods taught in the video instruction, or they would not count as right. The three dimensions were:

1) Shape;
2) Colour effect;
3) Layer order.

Efficiency—Efficiency refers to how quick participants could finish the task. It was measured by the time they needed to finish a task. Only data of participants who finished the first task were recorded and analyzed, which meant time which was longer than 30 minutes or shorter than 30 minutes but from a participant who gave up would both be excluded. Time was also recorded in the

retention test, but used as one of the indicators for performance in retention test.

Satisfaction—Satisfaction refers to user's attitude towards the tutorial and the whole experience of learning with these material. Satisfaction was measured by a satisfaction scale. (Loorbach, Karreman & Steehouder, 2013) (Appendix II)

Motivation—Motivation pertains to participants' feeling about the material. It was built on four sub-constructs, which were relevance, attention, confidence and satisfaction. Motivation was measure by an adapted RIMMS (Appendix III). The difference between the satisfaction as a sub-construct of motivation and the satisfaction mentioned above was that this one focused on the feeling of using the materials, instead of the materials themselves.

Self-efficacy—Self-efficacy refers to how capable users thought of themselves to finish a specific task. A high value of this construct would add positive value to the materials. Self-efficacy was measured by a self-efficacy scale. (Appendix IIII)

5.7. Data analysis

After all data needed were collected, they were pre-processed before being analyzed, in order to remove the data which are not qualified in nature. (For instance, because of some problems with Camtasia, the experiments with the first four participants were not recorded, which made it compulsory to remove their questionnaire data.)

After the pre-process, the data were imported into SPSS. Firstly the Cronbach' Alpha test was used to test the reliability of the data collected by scales. The score for satisfaction is .795. The scores for the four sub-constructs in RIMMS are: relevance: $\alpha = .568$, attention: $\alpha = .721$, confidence: $\alpha = .837$，and satisfaction: $\alpha = .851$. The relevance was proved not reliable. After the removal of the first question, the score raised up to .640. As to self-efficacy, the scale has four questions, however, the fourth one aroused some misunderstanding. Therefore it was removed from further analysis although reliability test proved that it was still reliable. After the removal, the score for self-efficacy is .745.

After the removal of data which were not valid, further analysis were carried out. For scale and ordinal data, Analysis of Variance (ANOVA) combined with a Tukey Post Hoc test were employed in order to find out if statistically significant differences exist, and if it did, where the specific

differences were. And nominal data were analyzed with Pearson's chi-square test, for the discovery of significant differences between groups. In all the tests above, group was used as dependent variate.

The open question was understood differently by participants, which made it not very meaningful. Therefor it was considered unreliable.

6. Results

6.1. Effectiveness

Effectiveness was measured by the following measurements: completion rate (including steps finished) and accuracy. Besides, participants' performance in retention test were also considered in effectiveness.

Expectation was that kanmaku group would have better performance in effectiveness: better completion and higher accuracy. For the first task, the numbers of people who did not finish were 4 for the control group, 4 for traditional comments group, and 3 for kanmaku group. No big difference seem to exist. A Chi-square analysis of the data proved that p = .895, which is way bigger than 0.05. Difference between the three groups is no significant. The average steps finished were 4.70 for control group, 4.70 for traditional comments group and 4.75 for kanmaku groups. ANOVA indicates no significant difference either (F(2,57) = .84, p = .438). As to accuracy, anticipation was that kanmaku group would have higher accuracy. However, it is rejected by data analysis. ANOVA shows that no group performed statistically significantly better than other groups (F(2,46) = 1.03, p = .376). (Table 1)

Table 1: Task 1 Effectiveness

	mean			F	Sig.
	Control Group	Traditional Comments Group	Kanmaku Group		
finish	16	16	17		.895
steps	4.70	4.70	4.75	.84	.438
accuracy	2.75	2.94	2.82	1.03	.367

In the retention test, three groups tie up in all evaluation aspects. No significant differences were found. For completion rate, p = .626. Average steps finished are also statistically similar

(F(2.57) = 1.00, p = .375). Time usage did not differ much either (F = 1.82, p = .179). And for accuracy, no big difference between scores existed either (F(2,29) = 1.11, p = .343). (Table 2)

Table 2: Retention Test

	mean			F	Sig.
	Control Group	Traditional Comments Group	Kanmaku Group		
finish	11	9	12		.626
steps	3.75	3.70	4.25	1.00	.375
time*	08'24"20	08'09"16	06'13"97	1.82	.179
accuracy	2.82	2.89	3.00	1.11	.343

* time refers to the time used by those who finished the task

6.2. Efficiency

Efficiency was measured by calculating and comparing the time participants used in each group used. Participants who did not finish the task were excluded. The expectation was that kanmaku groups would show better performance in difficult tasks, because comments may offer extra information which could be helpful and kanmaku shows these information in a more unignorable way. And in easy tasks, kanmaku would lower efficiency, for it may distract users' attention. However, data analysis (ANOVA) shows that although slight difference of the mean score exists between the three groups, it is not significant (F(2,46) = .91, p = 0.412). The mean scores for control group, traditional comments group and kanmaku group are 19'03"41, 20'26"79 and 17'54"73. (Table 3)

Table 3: ANOVA Results on Efficiency

	mean			F	Sig.
	Control Group	Traditional Comments Group	Kanmaku Group		
efficiency	19'03"41	20'26"79	17'54"73	.91	.412

6.3. Satisfaction

Satisfaction was measured by a satisfaction scale which refers to participants' four sides of feelings: interesting, understandable, good and pleasant to use. The expectation was that participants in kanmaku and traditional comments group would be more satisfied that those in control group, for extra information in comments would be more likely to give them answers they just needed. The difference between kanmaku group and traditional comments group would not be significantly different, because kanmaku would offer message more in time, however, it would also be a cognition burden to deal with too many information at the same time. Data analysis (ANOVA) shows that no statistical significant difference exist between kanmaku and traditional comments group, not does it exist between these two group and the control group ($F(2,57) = 1.31$, $p = .279$). Participants in any of the three groups were not more satisfied with the materials. (Table 4)

Table 4: ANOVA Results on Satisfaction

	mean			**F**	**Sig.**
	Control Group	**Traditional Comments Group**	**Kanmaku Group**		
satisfaction	3.69	3.91	3.55	1.31	.279

6.4. Motivation

Motivation was measured by RIMMS which contained four sub-constructs: relevance, confidence, attention and satisfaction. The expectation was that materials in kanmaku group would be the most motivated, then traditional comments group. Materials in the control group would be the least motivated. Because traditional comments group has more information, and for kanmaku group, other than the benefits the previous group has, it is also more colourful and appears more in time. However, ANOVA shows that except confidence, for all the other three sub-constructs, the traditional comments group are statistically significantly different that the other two groups (relevance: $F(2,57) = 4.80$, $p = .012$; satisfaction: $F(2,57) = 5.29$, $p = .008$; attention: $F(2,57) = 11.55$, $p = .000$). Scores for confidence are $F(2,57) = 2.83$, $p = .067$. Though the difference is not significant,

such tendency still exists. A Tukey Post Hoc test shows traditional comments group is significantly better than the control group on relevance and satisfaction (relevance: p = .011; satisfaction, p = .008), and better that kanmaku group on attention (p = .000). Besides, on the constructs of confidence and satisfaction, traditional comments group has the tendency to be significantly better that kanmaku group (confidence: p = .080; satisfaction: p = .056). Control group is significantly better than kanmaku group on attention (p = .001). Taken together, statistically significant difference still exists (F(2,57) = 4.83, p = .012). A Tukey Post Hoc test shows that the difference is between traditional comments group and both the other two groups. (Table 5)

Table 5: ANOVA Results on Motivation

	mean			F	Sig.
	Control Group	Traditional Comments Group	Kanmaku Group		
attention	3.33	3.43	2.47	11.55	**.000**
relevance	3.18	3.80	3.68	4.83	**.012**
confidence	3.33	3.85	3.25	2.83	.067
satisfaction	2.95	3.77	3.15	5.29	**.008**
motivation	3.20	3.71	3.14	4.83	**.012**

According to this result, users with traditional comments are more motivated than with the other two types of materials. Kanmaku did not show any advantages on motivation. On the contrary, on attention, it was even worse than video only.

6.5. Self-efficacy

Self-efficacy was measured by self-efficacy scale. The expectation was that participants in kanmaku group would be better, for the timely help and related messages in kanmaku would kanmaku would make users learn the instructions better. ANOVA shows that as expected, difference between three groups were statistically different (F(2,57) = 5.81, p = .005). A Tukey Post Hoc tests show that significant difference exists between control group and kanmaku group (p = .004). Between traditional comments group and control group, the significance is .060. Though it is not significant enough, we can still say than there are such tendency. (Table 6)

Figure 6: ANOVA Results on Self-Efficacy

	mean			F	Sig.
	Control Group	Traditional Comments Group	Kanmaku Group		
self-efficacy	3.78	4.25	4.45	5.81	**.005**

This result indicates that the kanmaku does give users more confidence over specific tasks, but as much as traditional comment does.

6.6. Observation and interview

Besides the data recorded, observation and informal interviews were also conducted and both yielded interesting results.

When asked whether they read the comments, only 9 out of the 20 participants gave positive answers. Among them, observation showed that only 7 people conducted the action of scrolling down the comments list. It is hard to tell if they really read the comments, or they just took the action. But is it sure that the other 13 only saw 17 out of the 60 comments at most. None of all participants claimed any benefit from the comments. When using these comments, most of the people who did not scroll down said that they read the first several comments to decide whether they would continue or not. The others had no intention to read the comments at all. One of them expressed that he would not use the comments anyway, even he did stuck somewhere. He would only replay the video repeatedly.

As to kanmaku group, 11 participants said that they read the comments, among which many only read the first several ones. However, it is not very reliable, because some of the people who admitted that they did not read the comments still wrote something from the comments when they were answering the open question about the content they still remember from the material. When asked about the feelings about kanmaku, most participants found it annoying and distracting. One participant said that the reason he did not read them is because that he thought they are ads, like what he usually saw on YouTube. However, about 5 people saw helpful information in it, and 3 of them did benefit from it, with 2 students problems solved and another one's action explained. He

said that when he made a mistake and the program told him to go to “appearance panel”, which was not mentioned in the video tutorial at all, he remembered that he saw this work in some comment. So he went back to look for that comment and successfully corrected his mistake.

Most people in the kanmaku group thought that comments which are closely related to the instructions are the only useful information. Though almost all kanmaku users were annoyed by the flying texts at their first use, it is delighted to know that they all managed to ignore them after using for a few minutes. They ideal method of using kanmaku would be to ignore them normally, and refer to them when in need. The original thoughts was that the most difficult part it to ignore them. But now it seems that it is not challengeable at all.

Despite being annoyed by these texts in video, they also showed interest in it, especially after I explained how kanmaku is used in real life. They think that kanmaku is acceptable if less comments are shown or it can be better customized. Some of them even expressed the idea that kanmaku can be a better way to present really helpful comments, such as those that correct errors in video or directly explain some steps.

7. Discussion

7.1. Usability

Effectiveness

Results indicates that kanmaku did not show any advantage over the other two groups in effectiveness.

Performance in three groups of participants in completion rate (including steps finished), accuracy or retention test performance are similar. The stress and cognitive load (Niculescu & Nijholt, 2009) of reading kanmaku probably cause participants’ dislike and inadaption in the first place. Users unfamiliar with kanmaku may also contributed to the result. During the experiment, many participants did met problems. They usually stuck at step 3 and step 5. However, only one student noticed the help information for step 3 and another one notice the help for step 5. As mentioned above, most participants ignored most of the kanmaku. They used kanmaku in the same way participants use traditional comments—read the first lines, and if nothing helpful appears,

ignore the rest. In the material, the first comments are in general all pertains to the first steps, which are pretty easy that most users have finished smoothly. It is very likely users form their pre-judge as unworthy of reading. Because of users' inadaption and this pre-judge, when they stuck, the idea of looking for solution in the comments did not hit them at all. They acted like participants in the other two groups, replaying the video and trying to figure it out on their own. Thus most people consciously used the material with kanmaku, and those with traditional comments, as video only material, which led to the result that no significant difference showed up. One thing that worth noting is that the 3 students who benefit from the kanmaku. All comments they used are in the later part of the video. In the traditional comments group, as a contrast, no one benefited from the comments. Exceptions the three example may be, it is reasonable to assume that comments shown as kanmaku are more likely to be seen and used by users than in the traditional way. After all, without the correspondence with the video, users may need more time and energy to find the comments they need, if they exist at all.

Efficiency

The results of efficiency shows that, compared to the other versions, kanmaku does not have significant advantage either.

The difficulty level of the task in this experiment should be comparatively hard, for only 2 out of 5 people in pre-test finished the task in about 30 minutes. The anticipation says that in hard tasks, kanmaku would yield better efficiency, which is not in line with the analysis results. One of the reasons would probably be participants' neglect of kanmaku, which is the same with the reason for effectiveness. As the interview showed, about half of the participants did not consciously read any of the comments. Without reading them, the material with kanmaku would function in the same way with the control version. Then it would not be surprised that they yielded similar results. Another reason may be that kanmaku distracted users' attention. With texts flying over, they may break users' attention on the instructions from time to time. The shifts of attention also cost time. Users' unfamiliarity with kanmaku may be another reason, which leads their neglect of the solution in comments when they met problems.

Satisfaction

Figure indicates that the same as effectiveness and efficiency, compared to control version and

traditional comments, kanmaku did not yield better result in satisfaction.

Compared to video only, traditional comments and kanmaku version have more information. However, with traditional comments, users need to scroll down and carefully looked for the messaged hidden in all the 60 comments. If users have already pre-evaluated them as mostly not useful from the first several comments, they are likely to lack of the patient to read all of them. Let alone that it is not guaranteed that they will find the exact information they need. As to kanmaku, with comments covering some of the demonstration, it is possible that they consider the material as not well organized. Probably for these reasons, their final scores were lowed and at last tied up with the control version.

7.2. Motivation

Generally traditional comments worked better than both kanmaku and video only. The latter two had almost the same performance. However, things are more interesting when looking at each specific construct.

Attention

Figure demonstrates that on the subject of attention, both video only and traditional comments worked better than kanmaku.

It is no surprise that such result occurred. Users can focus only on the video when working with video only version or traditional comments version. The video only has nothing extra. And in traditional comments version, comments are presented beside the video. It is very easy to ignore all comments and concentrate on the demonstration. The situation is totally different when working with kanmaku. Kanmaku shown in a more intrusive way, on one hand guarantees its being noticed by users, either carefully read or only in a glimpse. On the other hand, it disturbs the viewing of the tutorial. Especially all the participants are absolute novice on kanmaku. They needed to shun the disturbance of the flying text and keep their attention on the video, which is a challenge for new users. Moreover, kanmaku amplifies information delivered at the same time. Filtering and processing these messages is also challengeable. Good news is that all participants managed to deliberately ignore the flying texts after a trial of kanmaku for a few minutes.

Relevance

Both kanmaku and traditional comments are considered significantly more relevant than control version.

When learning with the video alone, all information user obtain is from the narration and the presentation in the video. As an instruction, the video's obligation is only to guide users to finish a task. The involvement a more peripheral information may not only be redundant, but also lead to users' antipathy, for different from paper-based materials, which are easy to scan and skip texts, videos are hard to address (as cited in van der Meij & van der Meij, 2014; Alexander, 2013). Information which is not directly related to the task procedures may add difficulties to using the instruction. Comments, however, can be the complement. No matter presented in the video or aside it, the form of text enables users to scan, ignore or read while watching the video. Diverse types of comments generated by huge amount of users are sources of abundant information, in which users will learn how the instruction can be related. Besides, the fact of being viewed and commented itself also means that the video is worth of watching.

Confidence

On the construct of confidence, no significant result has been yielded, only a tendency which exists between kanmaku and traditional comment.

The reasons may be that first of all, as mentioned above, kanmaku presents much information along with the video. The overload of information ("Information overload", 2009) is a cognitive burden to users. It negatively affected users to obtain the messages from the video, which are considers more important to users. The concern of missing information may lead the less of confidence during the operating. Another possible reason is that users noticed the useful information in the comments, however, it is beyond their ability to process all of them. They consider the message in comments as important as those in the video. Inability of obtaining all information which they thought they should be able to makes them less confident in the process. With traditional comments, probably due to the familiarity, users have a better sense of control. They exceedingly know how to use them and get all information they need, thus more confident.

Satisfaction

Figure shows that on the construct of satisfaction, which is as a part of motivation, traditional

comments version had significantly better performance than control version, and a tendency to be better that kanmaku version.

Satisfaction describes the pure feeling. People in the traditional comments group are clearly more satisfied with this experience, compared with those in the control group. And compared with kanmaku group, a tendency also exists. Traditional comments version of material has more information than control version, and better flexibility than kanmaku version. If they only want to focus on the instructions, the comments will not come out and to shift their attention. And if they want to use help in the comments, they know that they can always go to the list, and check them. Compared to this, kanmaku is very aggressive. It is not a surprise that people are uncomfortable when they feel offended. Besides, user's familiarity to traditional comments also contribute to its winning.

7.3. Self-efficacy

Figures indicates that kanmaku version yielded significant better result than control group.

Both self-efficacy and the confidence in RIMMS are related to users' confidence. However, they yielded different results. This is probably because that the confidence in RIMMS concerns about users' feeling during using the materials. Whether the materials make them confident. While the self-efficacy is about whether they have faith to finish specific tasks, after finishing learning the instructions. The focus of this construct is on task, instead of feeling.

When pertaining specific tasks, kanmaku ties up with traditional comments. Compared to control version, they both offer more helpful information, which participants have notices. These comments gave them deeper understanding of the task, thus better memory about the sub-tasks. Even they forgot, they are surer that they can get extra help from these comments instead of totally depending on the video instruct, no matter clearly organized or not, which gave them more confidence that they can recall the steps with the help of instructions.

8. Limitation and further study

In the experiment, some participants expressed their worry not finishing the task for their poor

computer skills. When they were stuck somewhere, some would say “I’m really not good at this”. Some, when saw me record the time, would ask me how long they used and where they ranked among all participants. Such messages indicate that although they know that in an experiment finishing or not does not really matter, they still have strong wish of completing quickly. Completion comes the first, then quickness, correctness the last. In real like, however, when people need to follow an instruction to do some task, quickness is probably not that important, but correctness is. For instance, one of the participant created an extra dot in the first step. He did not correct it but continued. When he was adjusting his final work, he noticed that. He wanted to correct it but had no idea how to delete it without going back to the first step. So he just gave up and handed in the logo with an extra dot. If it were his own task in real life, it is reasonable to elieve he would do whatever necessary to make sure that the final work is right. Besides, people read an instruction because they want to learn the method of dealing with something. Other than finishing it correctly, it is also important that they master the skill. It would be better is they can finish the task without instructions. But for participants in the experiment, they do not have the willing to lean it, since most of them would probably never use it after the test. They would ignore other information as long as they can finish the steps. When they made mistakes, they would continue as long as they fixed it, without figuring out what caused the mistake, which people may care in reality. The difference in attitude between participants in experiment and people in life may lead to different way of using instructional materials, such as more neglect of extra information, namely the comments.

The kanmaku materials used in this research only covered the basic function of kanmaku websites: comments in video (scrolling and fixed) and coloured texts. Nowadays, normal kanmaku sites allow users to minimized comments shown on the screen by filtering with keywords or other criteria. For this is only a preliminary study which mainly focuses the effect of showing comments in video, such features were not adopted. According to the interview with some participants, showing kanmaku all the time is distracting and annoying. Adding these options may amplify the benefit of kanmaku.

Further study can use better simulated kanmaku materials by adopting all features normal kanmaku websites have, even other option that may be useful, such as tagging comments as useful, liking useful comments, or the “@” function on Twitter to enhance chatting in comments and

questioning and answering. Besides, effect of kanmaku may be culture-related or influenced by users' experience with it. Further study can also be conducted with participants with profound experience with kanmaku.

Though both declarative and motivational comments were included in this research, they were all mixed up. The results of this experiment were generated from a mixture of both types of comments. Some participants reflected that they prefer directed related comments. Future study can focus on their separate effects.

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Appendix

Appendix I: Comments Used in Experiment

1) Does he have to speak that fast?!
2) Haha I like this video a lot. Very clear explanation and demonstration. Just the accent…….
3) I've never hear of Adobe Illustrator…..
4) DO NOT SKIP ANY FRAME!!!!
5) FOLLOW EVERY STEP!!! EVEN THE SEQUENCE OF THE STEPS!!!
6) This helped a lot with my homework
7) It is an easy task actually. Just need to focus on the tutorial.
8) Beginner here~
9) Same here. High five!
10) CreatNProcess! They also have tutorial videos for 3D Max
11) Where is the narrator from? His accent is hilarious… lolololololol
12) Saved! Thanks sooooooooo much!
13) They have many other tutorial videos for logos.
14) Change to "Selection Tool" before duplication :)
15) I cannot use Alt+drag to duplicate the shape. I did press Alt and dragged the shape. Anyone has any idea why?
16) Hey upstairs, did you use them together or one after another? You need to hold Alt while you drag the shape.
17) Make sure the ellipses are next to each other. Gaps makes the final shape terrible :P
18) The narrator is so adorable

19) His accent is a bit wired, but I like his voice
20) Agree
21) Actually Ctrl+D is to repeat your last movement, not to duplicate shapes. Only Alt+Drag is for duplication
22) When the guy says multiple times, don't be lazy. Do copy the ellipses multiple times. The final shape will be more beautiful.
23) How did he recorded the screen?
24) Hey upstairs, just search screen-recording software. I use Camtasia
25) Programmer learning design here lol
26) Hey nice to meet you programmer here too. Do we happen to be from the same company?
27) I'm taking down notes… I will be the master of Adobe Illustrator!!!
28) Strongly recommend One Note! Best ever
29) Evernote is better!
30) I' m here to watch you quarrel ←_←
31) In the "draw a rectangle step", a vertical rectangle works better for this.
32) Damn it the accent
33) Change the number of surface first, then map the symbol. Or it will appear at the top or bottom
34) Tick PREVIEW PREVIEW PREVIEW in the 3D Revolve step!!! Three times for important things :P
35) Haha the "?????" thing. The guy drove whoever made the subscript crazy
36) AI is a perfect tool for vector graph
37) Also for typesetting.
38) Typesetting? You should use InDesign
39) Use "Clear All" if something goes wrong in the mapping step
40) NEVER use enter when you input the figures!!! If you did...Appearance panel exists in Window->Appearance
41) So this is how the coca/cola tins are designed?
42) Is it a background music or someone whistling?
43) I guess it's someone whistling… lol
44) Small tip: when rotate the PARTICLES, just set the parameters the same as those in the video,

and adjust it afterwards. Saved a lot of time :)

45) Did the guy make this tutorial in his dormitory?
46) I bet he is still a student
47) Student here
48) Student too
49) I've already graduated for a long time. Am I old already?
50) When can I have a software so smart that it can automatically create all the images in my mind….
51) Does such people who master every function of Adobe Illustrator really exist? The software seems so powerful =_=
52) The "N" shape needs to be ungrouped two times. The guy didn't say that clear.
53) Don't go into the inner layer. Or you may lose some part of your logo :P
54) When you finish the 3D Revolve step and ungroup step, click at the blank part and then click at the left part to choose it.
55) The most complicated thing on earth
56) With Ctrl+C, Ctrl+V you can also duplicate a shape but the new one will be at the top layer
57) Why do you use a software when you can draw it by hand?
58) It is amazing that they can teach you how to create a beautiful logo which seems professional and usually complicated in about ten minutes! Awesome!
59) Oh I like this I made this logo I'm so happy
60) I feel like I can master this software quickly!

Appendix II: Satisfaction Scale

1) The tutorial material is interesting.
2) The tutorial material is understandable.
3) The tutorial material is good.
4) It is pleasant to use this tutorial material.

Appendix III: Revised Instructional Materials Motivation Survey (RIMMS)

1) It is clear to me how the material is related to things I already know.
2) The diversified methods of disseminating messages in the material helped to hold my attention.
3) As I worked with the material, I was confident that I could learn how to work well with Adobe Illustrator.
4) I enjoyed working with the material so much that I was stimulated to keep on working.
5) The way the information is arranged in the material helped keep my attention.
6) I really enjoyed working with the material.
7) The material convey the impression that being able to work with Adobe Illustrator is worth it.
8) After working with the material for a while, I was confident that I would be able to complete exercises with Adobe Illustrator.
9) The variety of images, voice, subscript, comments (if there are), etc., helped keep my attention on the material.
10) The content of the material will be useful to me.
11) The good organization of the material helped me be confident that I would learn to work with Adobe Illustrator.
12) It was a pleasure to work with such well-designed material.

Appendix IV: Self-Efficacy Scale

How certain are you that you can successfully perform the actions described below e, and if you wish, with the help of the accompanying video instruction?

(1) Create and duplicate a circle.
(2) Use 3D revolve effect on a symbol
(3) Create a shape and convert it into a symbol.
(4) Create a similar logo with Pic.1

Appendix V: Open Question

What can you recall from the video and comments (if there are) (please answer it briefly, 10 max)