# Learning from Video Examples in a Craft Demonstration task: Does Perspective Matter?

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Abstract

In example-based learning, learning from video examples is seen as an effective instructional strategy. Recent studies investigated the effectiveness of different characteristics in learning from video examples. However, these studies showed different results in first-person and third-person perspective depending on the type of learning task. Therefore, this study investigated differences in learning outcome and perceived competence on both perspectives in a craft demonstration task. 94 pre-vocational secondary school students viewed a video example of how to conduct a lino cutting task, in first-person or third-person perspective. After this viewing, students had to correctly reproduce the lino cut task. Results revealed no difference between both perspectives on learning outcome and perceived competence. These results suggest that in a craft task demonstration video, perspective does not matter. Theoretical and practical implications are discussed concerning boundary conditions of the perspective principle, for example task complexity and task orientation requirements. Orientation requirements should be taking into account during research on the perspective effect in video examples.

*Keywords:* example-based learning, video examples, perspective principle, demonstration task, orientation requirements.

# Learning from Video Examples in a Craft Demonstration Task: Does Perspective Matter?

On YouTube, we have access to a great variety of video examples on how to carry out a task, also called How-To videos (Mayer, Fiorella, & Stull, 2020). For example, if we search for How-To linocut, about 54000 instruction videos will appear in about 0.46 s (www.youtube.com). These videos are mostly filmed in a third-person perspective in which the camera is placed across from the instructor (Mayer et al., 2020).

Also, in educational settings, video examples are an increasingly used as an instruction tool. For example, demonstration videos, also known as video examples, (Ayres, Marcus, Chan, & Qian, 2009) are used in education for observing and reproducing a task on demand. In this type of video, a model demonstrates a task and explains how the task must be performed (Hoogerheide, Loyens, & Van Gog, 2012). Unfortunately, despite the growing interest of implementing this instruction tool in secondary schools, only a few studies examined what kind of video design is most effective for instruction (Fiorella, Van Gog, Hoogerheide, & Mayer, 2017). As a result, multiple instructional designers still develop their instruction video materials on intuitive basis (Narayanan, & Hegarty, 2002). So, if we conduct more research on what characteristics in instruction videos would increase the benefits of learning, then we can develop more effective instructional tools for educational purposes.

## Example-based Learning

Video examples used to illustrate an example of a task is also known as example-based learning. In example-based learning, learners *borrow* the knowledge from another and reorganize it to add to their own existing knowledge and use it for

their own purposes (Sweller & Sweller, 2006). The effectiveness of these video examples can be viewed from multiple perspectives (Mayer, 2014).

Learning by observing and imitating another is emphasized by the social learning theory (Bandura, 1977, 1986). When a student observes a video example of a task being completed by another person this stimulates self-efficacy, which means the individual's belief in his or her ability to execute tasks and achieve goals. The social learning theory states that a higher self-efficacy has a positive effect on learning outcome (Bandura, 1977, 1986). Thus, video examples have influence on learning outcome caused by the stimulation of self-efficacy.

In addition, from a cognitive theoretical point of view, example-based learning is an effective way to learn (Sweller, Van Merrienboer, & Paas, 1998). Examples, on paper or performed by instructors, are used to prevent trial and error strategies. Trial and error strategies lead to an ineffective way of learning. This is especially ineffective for students with little prior knowledge, because it leads to misconceptions that cannot easily be rectified later (Sweller et al., 1998). Thus, example-based learning prevents the development of misconceptions.

According to the cognitive load theory (Van Merrienboer & Sweller, 2005), employing examples affects the cognitive load of a learning task, which means the amount of mental activity in the working memory of the learner. Renkl, Hilbert, and Schworm (2009) suggest that providing examples can reduce extraneous load, which means reducing the load that is generated by the manner in which information is presented to the learner. Also, Renkl et al. found that providing examples prevents cognitive overload by focusing attention on the most relevant aspects of the task. So, providing examples lead to a higher learning outcome because examples reduce the amount of cognitive load.

## Effectiveness of Video Examples

Based on this cognitive load theory, Mayer (2017) investigated effective instruction strategies to increase learning outcome and effectively transfer the theory into the learner's own practical situation. To prevent overload in the working memory, Mayer formulated twelve multimedia principles to enhance learning in video examples. For example, the *modality principle* states that people learn better when text is spoken rather than printed text with graphics. Also, Mayer mentioned the *image principle*, which says that students do not necessarily learn better when the model is visible on screen. In video examples where the object is being manipulated, the instructor's presence might even be distracting (Mayer, 2017). According to Fiorella and Mayer (2018) the focus must be on the process of the object, so the hands of the model performing the task are more important than the model itself. In sum, a visible instructor is not needed in designing object manipulation videos (Fiorella & Mayer, 2018) and the use of spoken text in video examples is recommended (Mayer, 2017).

**Video perspectives.** Recently, Mayer et al. (2020) added the *perspective principle* to increase the effectiveness of video examples. The perspective principle stated that videos should be taken from first-person perspective, because first-person perspective leads to a sense of self-reference that creates a stronger memory for actions.

Fiorella et al. (2017) acknowledges the role of perspective, particular in video examples with object manipulation. While watching video examples, learners use a representation of their bodies to help them mentally represent complex material. Thus, the perspective of video examples may influence how learners experience the lesson (Fiorella et al., 2017; Mayer, 2014). In particular, compared to third-person

perspective, learners become more engaged in the learning experience by seeing the material from first-person perspective (Fiorella & Mayer, 2018). An explanation for this conclusion could be that in third-person perspective learners must transform the representation into first-person perspective. Learners see the example in third-person perspective but they see the first-person perspective when they perform the task. Considering cognitive load, this transformation leads to a higher load on the working memory that reduces the learning outcome (Barsalou, 2008; Wilson, 2002). This extraneous load can be prevented when the task is demonstrated from a first-person perspective (Hegarty & Waller, 2004; Kessler & Thomson, 2010). In addition, Lindgren (2012) found that first-person perspective participants paid more attention to the task-related elements. This suggests that first-person perspective beneficially focuses attention to information that is essential for reproducing the task. Taken together, these studies indicate that first-person perspective should be used in designing video examples.

**Different types of learning tasks.** However, in an experiment of Boucheix, Gauthier, Fontaine, and Jaffeux (2018), containing a video example of a complex medical procedure for students in their second year of nursery school, no difference was found between first-person and third-person perspective in overall performance. After follow-up analyses of how specific parts of the video correspond to performance, findings suggest that it depends on the type of task. Some tasks were best presented in third-person perspective, but first-person perspective is more suited for tasks that require a precise form of focus. This conclusion could be explained by the argument that characteristics of the task affect the choice of instructional design (Boucheix et al., 2018). Further research is recommended to investigate whether first-

person perspective or third-perspective is more effective for performance on different kind of tasks, for example a technical demonstration task (Boucheix et al., 2018).

Fiorella et al. (2017) found that students who viewed an assembly video from a first-person perspective performed significantly better than those who viewed the video from a third-person perspective. However, this difference was only found on a high-complex circuit board assembly task with multiple interacting elements. Whether the difference in learning between different perspectives only applies to complex tasks, such as assembling the components of an electric circuit, or also to other types of tasks, is a question for future research to address (Fiorella et al., 2017). As stated by Mayer et al. (2020), "research is needed to determine the conditions in which the perspective principle applies" (Perspective Principle section, para. 5).

**The Present Study**

To further determine the conditions of the perspective principle, this present study researches perspective in a video example on a technical task, as previous studies were conducted on an assembly task (Fiorella et al., 2017) and a medical task (Boucheix et al., 2018). Although it seems that first-person perspective is more beneficial for learning outcome, it is still unclear to which type of learning tasks this applies. In this present study, video perspective might be particularly important because the motoric nature of a technical task asks for a precise form of focus. Therefore, it is important to investigate whether the perspective principle applies to this type of learning task.

Apart from the type of learning task, authenticity of the learning task could be of influence on the outcome. For example, the study of Lindgren (2012) was limited because no research was done in context of where these tasks should be performed. Also, Fiorella et al. (2017) recommend further investigation to determine whether

their findings can be found in an authentic educational setting. This means that the theoretical importance of this present study could bridge the knowledge gap by conducting this research in an authentic educational environment, as previous studies have been conducted in a lab.

Also, the population of this study is different from the aforementioned studies. In the study of Boucheix et al. (2018), the participants were nursery students with some general prior knowledge of the task content. This present study focuses on secondary school students who have no prior knowledge on conducting a craft task. In the experiment on video perspective by Fiorella et al. (2017), participants had no prior knowledge of the performed task, but these participants were university students compared to the pre-vocational secondary school students in this present study. For example, the differences in an adolescent brain compared to an adult brain might have influence on the performance and learning outcome. In conclusion, with this present study we can clarify the generalizability of perspective in video examples in different contexts, such as an educational context like secondary school.

In secondary school, students become more responsible for learning, which causes the need for education on demand. This means, in practice, the role of the teacher shifts from the sage on the stage to a guide on the side. To increase this role, video examples may be a source of support. As mentioned in Hoogerheide et al. (2012), instructional videos satisfy students learning needs on demand and give teachers more time to deliver support and guidance on demand. In future classes of technical and art education, the purpose of these video examples is to demonstrate how to succeed in a craft task, for example how to perform a lino cutting task. Thus, the practical importance of this present study is to investigate which perspective in

this type of video examples would be effective for secondary students, so effective videos examples can be developed for future classes.

Derived from the literature reviewed above, the main question in this study is: To what extent does perspective (first-person or third-person) affect performance and learning outcome during a video example for secondary school students? This research question can be divided in two sub questions.

In order to investigate whether perspective affects learning outcome in terms of performance, the question is: Does video perspective affect task performance in reproducing the demonstrated task? The results of Fiorella et al. (2017) showed that the third-person perspective group make more mistakes in reproducing a certain kind of task than the first-person perspective group. Also, Lindgren (2012) mentioned that first-person perspective leads to a better focus on the important information. Based on the results of these studies, it was hypothesized that the first-person perspective group outperforms third-person perspective group on task performance.

To investigate whether perspective affects the students' confidence on reproducing the task, the sub question is: Does the perspective affect perceived competence on reproducing the task? Because students need to perform the task by themselves after being instructed, it is interesting to see whether the students feel competent in applying the knowledge. Derived from literature, video examples that demonstrate how a problem can be solved can enhance confidence in performing the task (Hoogerheide, Wermeskerken, Loyens, & Van Gog, 2016). However, whether perspective of a video example affects perceived competence, is not yet clear. Derived from the cognitive load theory (Barsalou, 2008; Wilson, 2002), it is expected that third-person perspective leads to more extraneous load, which leads to a decrease of perceived competence. This may support the hypothesis that the first-person

perspective group will show higher perceived competence than students in the third-person perspective group.

## Method

### Design

To test differences in learning outcome between first-person and third-person perspective in a video example, a quantitative experiment was conducted. Based on the between-subject factor: the perspective of the video example (first-person or third-person) students were assigned to one of these two conditions. So, every student viewed one of the two videos: the third-person perspective or the first-person perspective. The first-year students conducted the experiment in the second semester of secondary school when the topic of lino cutting had not yet been taught.

### Participants

Based on a power analysis using G*Power with an expected medium effect size of $f = .25$, the desired sample size for this study was 128 students to reach an acceptable power of .80. Due to the Corona virus lockdown on March 16, three classes were not able to participate in this study, which limited the sample size to 94 first-year students. All students studied on the same Dutch pre-vocational secondary school (34 young women, 60 young man, $M_{age} = 12.86$, age range: 12-14 years). All students joined voluntarily and gave informed consent during the online pre-test. There were 49 students in the first-person perspective group (20 young women, 29 young man) and 45 students in the third-person perspective group (14 young women, 31 young man). To avoid performance issues caused by age difference, students were split up in age groups and then assigned to first-person or third-person perspective.

### Instruments

**Video examples.** The material consisted of two computer-based instruction videos, one of each perspective: first-person perspective and third-person perspective. The videos were recorded with an iPhone 8 camera (resolution: 720p) and a Samsung S10 camera (resolution: 720 p), on two tripods at a distance of 40 cm from the target workspace and both cameras focused on the same relevant information (e.g., hands of the teacher, working tools). To provide the same information in each perspective the video did not show the teachers face. The first-person perspective video showed the teachers hands as if the observer would perform the task itself and the third-person perspective video showed the teachers hands as if the teacher faced the observer completing the task (see Figure 1). Both the videos showed the same professional teacher (female, 32 years old and seven years of experience in practice) performing the lino cutting task.

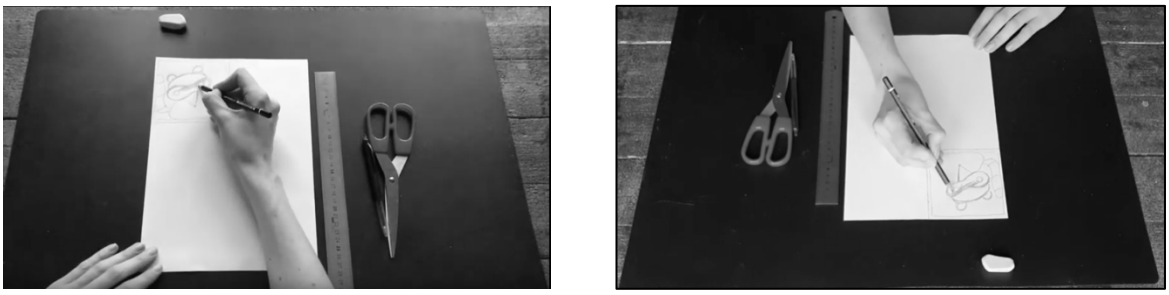

*Figure 1.* Shot from the video example sketch stage in first-person perspective (on the left) and third-person perspective (on the right).

In both perspectives, students learned how to perform the lino cutting task in a 6 min 53 s duration video. As the teacher performed one step of the lino cutting task, oral instruction identified the working tools and described how to use them. The performance consisted of 13 steps divided in three stages (see Appendix A). In each stage, the video contained a block of written text that summarized the previous oral instruction. Both videos were edited with iMovie video software (Version 10.1.14) and contain a similar amount of shots, cuts, and speed ups. The speed ups were only

placed in moments that oral instruction was finished and no new information was shown. These speed ups were supported by neutral music.

Both videos were presented in Qualtrics (www.qualtrics.com, Version March 2020) and viewed on the student's personal laptop. By manipulating the survey flow, participants watched one of the two videos depending on their version: first-person perspective in Version 1 and third-person perspective in Version 2. The videos were scaled to 720x1080 pixels and coded in such way that participants could not pause, skip, rewind, or repeat the instruction video.

**Pre-test.** Prior knowledge on lino cutting affects the outcome in performance on the lino cutting task. Therefore, prior to the instruction video, participants filled in a prior knowledge questionnaire to measure students' prior knowledge in performing a lino cut task. The questionnaire was conducted with the Qualtrics survey software (www.qualtrics.com, Version March 2020) and rated their relevant prior knowledge by answering yes or no on three items: (a) *I have worked with linoleum before,* (b) *I have experience with cutting linoleum*, and (c) *I know how to print a lino*.

**Mental effort.** The students were instructed to reproduce the lino cutting task in class on their own, without asking questions or referring to any documents. To measure how much effort a student invested while completing the craft task, the mental effort rating scale was used (Paas, 1992). This 9-point rating scale seemed to be sensitive enough to identify objective differences in task complexity (Ayres, 2006; Paas & Van Merrienboer, 1994). The mental effort rating scale was handed out on paper after completing the lino cutting task. Mental effort ratings ranged from 1 (very low mental effort) to 9 (very high mental effort).

**Task performance.** To measure task performance, the lino cutting task was divided in 13 steps. Each step was scored with points based on the existing scoring

grid of Boucheix et al. (2018). This scoring grid was revised in Dutch using the steps of the procedure of lino cutting instead of the medical procedure steps (see Appendix A for the lino cutting scoring grid). The 13 steps in the scoring list were discussed and approved by four professional art teachers. This resulted in a scoring system where all steps were equally rated. Consensus was reached on the criteria that defines the scoring system (see Appendix B for an overview of the criteria definition). The step scored 0 points if it was not performed at all, 1 point meant that the step was incompletely or incorrect performed, and 2 points meant that the step was performed completely and correct. For example, students received 0 points in step 2.2 when they had forgotten to use the wooden cutting block at all. They received 1 point if they used the wooden cutting block incorrectly (e.g., the linoleum was not placed right on the wooden cutting block or the wrong way around). They received 2 points if the wooden cutting block was used correctly and the linoleum was placed according to the guidelines in the instruction video. In total, 26 points could be earned if three stages were performed perfectly. The task performance was measured by the total amount of points scored on each step and rated by two art teachers. Considering that each class had maximal 18 students, one art teacher scored maximal 9 students at a time.

**Self-efficacy and perceived competence.** To measure if the students felt that they had mastered the lino cutting skill, a 9-point rating scale was used to measure self-efficacy on a scale of 1 (*not at all confident*) to 9 (*very, very confident*) (Bandura, 2006). Also, the Perceived Competence Scale for Learning from Williams and Deci (1996) was used to measure if the students felt capable to perform the task themselves without the need of guidance (see Appendix C). This 9-point rating scale for perceived competence has also been adapted and used by Hoogerheide et al. (2016) in

learning from video examples. Students were asked to scale their confidence in producing and reproducing the task themselves, ranged from 1 (*not true*) to 9 (*very true*). Both questionnaires were handed out on paper after completing the lino cutting task.

**Procedure**

Parents of the first-year students received a letter about the content of this study (see Appendix D for the information letter). The letter contained informed consent on whether their child was permitted to participate in this study. In this letter, parents were asked for permission trough the communication software *Magister.*

The experiment took place in class with a maximum of 18 students, according to their existing schedule. All students were informed to bring their own earplugs and laptop. The teacher informed the students to reproduce as many steps as possible in the lino cutting task after watching the video. There was an opportunity to ask questions, considering that working with a video example differs from the traditional instructions given by the teacher. Also, students received their participation number and version number on paper (Version 1 or Version 2) including a hand out on how to prepare the Qualtrics survey on their laptop. In this hand out, they were asked to check whether the audio on their laptop was working correctly. Next, students were asked to write their participant number on a sticker and to wear this visibly during the reproduction of the lino cutting task. They were informed that they joined voluntarily by giving active permission in the Qualtrics survey.

The Qualtrics survey showed either the first-person perspective video (Version 1) or the third-person perspective video (Version 2) depending on their version number. Both versions contained the same questions about gender, age, permission, and three prior knowledge questions prior to the video example. After finishing the

Qualtrics questionnaire, students waited for the teachers sign to go to the next step. All students used earplugs and viewed their video example on their laptop at the same time. After watching the video example, they were asked to reproduce the lino cutting task without asking any questions. Students were informed that they were only corrected if safety was compromised. In this case, the student received 0 points for this step. While reproducing the lino task, two teachers assessed the steps by completing the scoring grid by hand. All students received the materials necessary to reproduce the task. Reproduction of the lino cutting task took about 50 min and the total duration of the experiment was approximately 70 min.

After completing the task, students completed the self-efficacy questionnaire and perceived competence questionnaire that was already handed out on paper. Students were thanked for their participation and were asked to clean up their working space.

**Data Analysis**

The statistics of the two groups were analyzed by the computer program SPSS statistics (Version 24.0.0.1). Because the assumption of normality was violated for all outcome measures, a non-parametric Mann Whitney *U* test was used for every main analysis instead of an independent *t*-test. To clarify whether the two groups differ in prior knowledge, a pre-test was conducted, where students scored 1 (*I do have knowledge of performing a lino task*) or 0 points (*I do not have knowledge of performing a lino task*). To investigate whether perspective in a video example affected learning outcome, three Mann Whitney *U* tests were carried out, with task performance, perceived competence, and self-efficacy as dependent variables and perspective as independent variable. For task performance, students could have

earned a maximum of 26 points. The sum of each students' points were compared between the two groups.

In addition to the Mann Whitney *U* tests, Bayesian analyses were conducted with JASP (Version 0.12). With Bayesian analyses, the likelihood of the data is considered under both the null and alternative hypotheses. The advantage of the Bayes factor is, compared to the independent *t*-test, that Bayes factor measures the comparison of how likely the null hypothesis is compared to the alternative hypothesis. The probability of the data fitting under the null hypothesis in contrast of fitting under the alternative hypothesis is expressed as a Bayes factor (BF). For example, a $BF_{01} = .5$ indicates that the data is half as likely under the null hypothesis as they are under the alternative hypothesis (Jarosz & Wiley, 2014). In the result section, the Bayes factor was reported for every analysis.

## Results

The data consisted of 94 students with no missing values. The first-person perspective group and third-person perspective group did not significantly differ in terms of average age, gender, or prior knowledge on conducting a lino cutting task. On task performance, no outliers were found with a *z*-score larger than 3. Visual inspection of the histogram and inferential Shapiro-Wilk test indicated that the assumption of normality was violated. Therefore, non-parametrical Mann Whitney *U* tests were used to see whether both perspectives differ in task performance with an alpha level of .05 for every statistical test. The sum of three pre-test questions did not significantly differ between the first-person and third-person perspective, $U = 1095.5$, $z = -.13$, $p = .90$, $r = -.01$. This means that prior knowledge on performing a lino cutting task was similar among the two groups. Also, Mann Whitney *U* test showed no significant result on task performance between the two raters, meaning that

differences in rating between the two raters is not of influence on the outcome of task performance, U = 1003.5, $z$ = -.76, $p$ = .45, $r$ = -.08. See Table 1 for the range, mean, median, and standard deviation for measures on perspective used in the following analyses.

Table 1

*Range, Mean, Median, and Standard Deviation of Major Study Variables in First-person Perspective and Third-person Perspective.*

| | First-person perspective[a] | | | | | Third-person perspective[b] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *Mdn* | *Min* | *Max* | *M* | *SD* | *Mdn* | *Min* | *Max* |
| Task performance (0-26) | 19.08 | 3.97 | 19 | 10 | 25 | 19.42 | 3.49 | 20 | 11 | 26 |
| Perceived competence (3-21) | 14.98 | 4.01 | 15 | 5 | 21 | 16.01 | 3.83 | 17 | 4 | 21 |
| Self-efficacy (0-100) | 67.04 | 19.26 | 70 | 0 | 100 | 69 | 17.44 | 70 | 30 | 100 |
| Mental effort (1-9) | 5.25 | 1.93 | 6 | 1 | 9 | 5.41 | 2.24 | 6 | 1 | 9 |

*Note.* [a]$n = 49$. [b]$n = 45$.

**Task Performance**

To address the research question if difference in perspective would enhance task performance, the Mann Whitney *U* test was conducted with first-person and third-person perspective as between-subjects variable and total points on the lino cutting task as dependent variable. Results showed that the first-person perspective group (*Mdn* = 19) and the third-person perspective group (*Mdn* = 20) did not differ significantly in their performance on the lino cutting task, $U = 1055.01$, $z = -.36$, $p = .721$, $r = -.04$. Points earned for task performance ranged between 10-26 points. Therefore, the null hypothesis that there are no differences between the two groups on task performance cannot be rejected. An estimated Bayes factor of $BF_{01} = 4.234$ was found on task performance, indicating that the data is 4.234 times more in favor of the null hypothesis than under the alternative hypothesis.

**Self-efficacy and Perceived Competence**

The Mann Whitney *U* test was conducted to assess whether self-efficacy was related to first-person or third-person perspective. Results showed no significant difference between first-person perspective (*Mdn* = 70) and third-person perspective (*Mdn* = 70) on self-efficacy, $U = 1088$, $z = -.11$, $p = .91$, $r = -.01$. Two participants were identified as outliers due to their very low self-efficacy score (*z*-score lower than -3). Removing these outliers did not affect the result of finding no significant differences, $U = 1027$, $z = -.24$, $p = .81$, $r = -.02$. The Bayesian analysis, including the outliers, showed a Bayes factor of $BF_{01} = 4.482$, indicating that the data is 4.482 times more in favor of the null hypothesis, stating that there is no difference in self-efficacy between third-person perspective and first-person perspective. Further, no significant difference was found between first-person perspective (*Mdn* = 15) and third-person perspective (*Mdn* = 17) on perceived competence, $U = 920.5$, $z = -1.38$, $p = .17$, $r =$ -

.14. The Bayesian analysis showed a Bayes factor of $BF_{01} = 2.259$, indicating that the data is 2.259 times more in favor of the null hypothesis. This finding suggests that it is 2.259 times more likely that there is no difference in perceived competence between third-person perspective and first-person perspective.

**Mental Effort**

The amount of mental effort on performing a lino cutting task through a video example indicated no significant differences between first-person perspective (*Mdn* = 6) and third-person perspective (*Mdn* = 6), $U = 999$, $z = -.79$, $p = .43$, $r = -.08$. On this 9-point scale, points ranged between 1-9 points. The Bayesian analysis showed a Bayes factor of $BF_{01} = 4.318$, indicating that the data is 4.318 times more in favor of the null hypothesis, stating that it is 4.318 times more likely that there is no difference in mental effort between third-person perspective and first-person perspective.

## Discussion

The question of this study is whether performance outcome differ between first-person and third-person perspective in a crafts task video example. This question is divided into two sub questions; whether differences in perspective affects learning outcome and whether differences in perspective affects perceived competence. The hypothesis in both sub questions, that first-person would outperform third-person perspective, is not supported by the results in the previous section.

Finding no significant difference in first-person and third-person perspective on both task performance and perceived competence is in line with the study of Boucheix et al. (2018). This study showed no difference in first-person and third-person perspective on task performance and students' confidence while completing a medical procedure. Results of the Bayesian analysis on perceived competence suggests that it is 4.482 more likely that no difference in first-person and third-person

perspective would be found on perceived competence. Also, the result that task performance did not differ between the two conditions is supported by findings of the Bayesian analysis, suggesting that the null hypothesis is 4.234 more likely than the alternative hypothesis. It is 4.234 more likely that no difference in first-person and third-person perspective would be found on task performance. These findings are in contrast with the study of Lindgren (2012), in which first-person perspective was recommended as being the best decision.

**Task Complexity**

An explanation for the contrasting results might be found in the complexity of the task. Fiorella et al. (2017) mentioned that the complexity of the task might be a boundary condition, because the perspective effect was strong for high-complexity tasks, but not for low-complexity tasks. Compared to the result on task performance in this study, no student scored less than 10 points, and the mean for task performance on both perspectives was respectively 19 points. Considering that 26 points was the maximum amount of points that could be earned, these high results might indicate a ceiling effect on task performance. As a result of low-complexity in this present study, the overall working memory load is lower, and additional processing demands imposed by watching third-person perspective will not hamper learning (Sweller, Ayres, & Kalyuga, 2011). This result supports the explanation that the task was not complex enough to find a significant difference between first-person and third-person perspective.

**Mental Effort**

The explanation that the task in the present study was not complex and thus did not tax students' working memory is also supported by the results on mental effort. In this present study, mental effort shows no significant difference between

first-person and third-person perspective as results show nearly the same outcome (see Table 1). This is in line with the study of Fiorella et al. (2017), where mental effort ratings also did not significantly differ between the same two conditions. Fiorella et al. explains this finding with the argument that students are used to see instruction performed from a third-person perspective on a daily basis. Since students in the present study are used to instruction from the instructor, which is equal to the third-person perspective video example, this could be an explanation for finding no difference between the two conditions. In sum, the result of finding no differences on mental effort between the two conditions might be explained by the low-complexity of the task, but may also be due to what students are used to with regard to instruction.

**Orientation Requirements**

However, there may be another explanation for finding possible differences in perspective on task performance, related to the orientation requirements. Orientation skills are needed to succeed in the orientation requirements of a task (Wong, Castro-Alonso, Ayres, & Paas, 2018). According to Wong et al. (2018), these orientation skills are a specific part of spatial ability skills. Because spatial ability skills seemed to be highly correlated with constructing mental animation and understanding from visual presentations, orientation skills seemed also correlated (Hegarty, Kriz, & Cate, 2003; Hegarty, Montello, Richardson, Ishikawa, & Lovelace, 2006; Hegarty & Sims, 1994; Hegarty & Waller, 2005; Narayanan & Hegarty, 2002). This means that spatial ability and specifically orientation skills might be at play while transforming information from third-person perspective to students' own perspective.

Fiorella et al. (2017) found no significant correlation between spatial ability and task performance in their study, although video examples from the third-person

perspective led to more errors related to the placement of components. The finding that participants in third-person perspective seems to have more difficulty to recall positioning, suggests that although spatial ability is not correlated, orientation requirements might be of influence on task performance.

This argument is also stated in the study of Wong et al. (2018) by three spatial ability tests on a hand-manipulative task (Lego construction). The Corsi Block Tapping test distinguished itself from other spatial ability tests because it measures recall position and sorting within spatial ability. This test showed significant influence on task performance. The other two spatial ability tests, which did not measure recall position and sorting, showed no influence on task performance. This finding suggests that orientation requirements of the task can be of influence on task performance, even if spatial ability is not (Wong et al., 2018).

Compared to the study of Fiorella et al. (2017), the task in this present study is a reproduction task that requires less orientation skills. That is to say, the video example of a lino cutting task did not demand any specific placements of components that requires orientation skills. Considering the above, the lack of task orientation requirements could be an explanation for finding no difference in perspective on the outcome of this present study.

**Further Directions and Limitations**

Therefore, it might be important for further research to take orientation requirements of the learning task into account during research on the perspective effect in video examples. For example, adding the Corsi Block Tapping Test (Wong et al., 2018) might clarify the boundary conditions in complexity of the learning task. These boundary conditions can distinguish which type of tasks are best suited for

first-person perspective and in which tasks this does not matter. This might contribute to the conditions under which the perspective principle applies (Mayer et al., 2020).

Finding no effect on task performance is interesting in the light of previous studies that recommended further research on generalizability of the perspective effect (Boucheix et al., 2018; Fiorella et al., 2017; Mayer, 2020). For example, this finding contributes to the study of Fiorella et al. (2017), stating that learning from first-person perspective mostly applies for complex tasks. This study provides support for finding no difference in perspective if the task has a lack of complexity, considering the ceiling effect in task performance. However, it is also a limitation that the task did not contain the complexity that had been predicted at the beginning of this study. As a result of the high performance on both perspectives, it cannot be rejected that a ceiling effect might conceal an effect between first-person and third-person perspective on task performance and perceived competence.

In practice, this study contributed to Fiorella et al. (2017) recommendation of further research in an authentic learning environment, as it was conducted and carried out in secondary school. Furthermore, authentic educational material was used for the video example and digitalized by professional art teachers. This means that the task in this present study is specially fitted for the first-year students, with content that is equal to the first-year learning curriculum. Unfortunately, a limitation of this study is due to the fact that task performance was scored by two raters. Although the two raters did not significantly differ in score on task performance, there is a possibility that the two raters scored the student different from each other. This means that reliability on rewarding the students the same amount of points is questionable. Furthermore, the scoring grid was discussed by professional art teachers in advance, but there was no pilot conducted to check whether they scored equally in practice. To

obviate this problem in the future, a pilot can be conducted in which the raters can practice the scoring grid together. Also, recording the process intercepts the limitation of two raters. Although this was not possible in this current study for privacy reasons, in subsequently studies this would allow multiple people to asses task performance.

**Conclusion**

In conclusion, the goal of this study was to investigate if first-person or third-person perspective would be most effective for learning related to a craft task video example. The overall results showed no difference in first-person and third-person perspective on task performance and perceived competence. It seems that as long as the task does not heavily rely on spatial locations, it fortunately does not matter if the instruction video is taken from first-person or third-person perspective. For designing effective instruction tools in the future, this study contributes to the theoretical boundary conditions of task characteristics in learning from video examples. It is for future research to address the boundary conditions of perspective taking due to orientation requirements of the learning task.

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## Appendix A

Scoring grid for the steps in the procedure (Boucheix, Gauthier, Fontaine, & Jaffeux, 2018), vertaald naar het Nederlands en toegepast op de linosnede taak.

| Stap van de procedure | Punten<br>0 Niet gedaan<br>1 Incompleet<br>2 Compleet |
|---|---|
| 1. Voorbereiding Linosnede | |
| 1.1 Vierkant tekenen van 10x10 op schetspapier | |
| 1.2 Dikke Lijntekening maken | |
| 1.3 Tekening 50/50 zwart-wit verdelen | |
| 1.4 Tekening uitknippen | |
| 1.5 Met carbonpapier de lijnen overzetten | |
| 2. Linoleum snijden. | |
| 2.1 Linoleum zwart-wit verdelen | |
| 2.2 Zaagplankje gebruiken | |
| 2.3 Hand achter het lino werk | |
| 2.4 Witte vlakken weg gutsen | |
| 3. Afdrukken linosnede | |
| 3.1 Kleine hoeveelheid inkt pakken | |
| 3.2 Inkt uitrollen tot een sissend geluid | |
| 3.3 Krant onder het drukpapier | |
| 3.4 Lepel gebruiken bij het afdrukken | |

## Appendix B

Definities van de linotaak criteria en de definiëring binnen het toekennen van het juiste aantal punten per criteria.

| Criteria | Instructie in de video: | 0 punten | 1 punt | 2 punten |
|---|---|---|---|---|
| 1.1 10 x 10 vierkant | 'Met een liniaal teken je een vierkant van 10 bij 10 cm.' | Er is geen vierkant getekend | Het vierkant is ongelijk, heeft een verkeerde afmeting of is zonder liniaal getekend | Het vierkant is 10 bij 10 cm |
| 1.2 Dikke lijnen | 'Maak je lijnen extra dik en voorzie je schets van een zwarte rand.' | Er zijn geen dikke lijnen gebruikt | Dikke én dunne lijnen zijn zichtbaar | Alle lijnen zijn verdikt en er is een rand aanwezig om het werk |
| 1.3 50/50 zwart wit | 'Verdeel je je schets in grijze en witte vlakken. Ongeveer 50% grijs en 50% wit.' | De vlakken zijn niet verdeeld in grijs en wit | De vlakken zijn verdeeld in grijs en wit, maar hebben geen verhouding van ongeveer 50% grijs en 50% wit | De vlakken zijn verdeeld in grijs en wit en de verhouding is ongeveer gelijk. |
| 1.4 Schets uitknippen | '..Knip je schets vervolgens uit.' | De schets wordt niet uitgeknipt maar blijft op het schetspapier | De schets is er uit gescheurd of gesneden zonder het gebruik van een schaar | De schets is uitgeknipt met een schaar |
| 1.5 Carbonpapier gebruiken | 'Met carbonpapier en een pen zet je de schets over op het linoleum. Leg het linoleum neer, leg het carbonpapier hierop, met de zwarte zijde naar beneden.' | Er is geen carbonpapier gebruikt bij het overzetten van de schets | Er is carbonpapier gebruikt, maar deze is niet juist toegepast bij het overzetten van de schets (verkeerd om) | Er is carbonpapier gebruikt en op een juiste manier toegepast bij het overzetten van de schets. |
| 2.1 Linoleum zwart wit stift | '..Verdeel je het linoleum in zwart en wit, je gebruikt hiervoor een stift.' | Op het linoleum is geen zwarte stift gebruikt om de vlakken te verdelen | Er is een zwarte stift gebruikt, maar alleen de lijnen zijn hierbij overgetrokken | Er is een zwarte stift gebruikt en zowel de lijnen als de vlakken zijn zwart ingekleurd |
| 2.2 Zaagplank gebruiken* | 'Voor de veiligheid gebruik je een zaagplankje. Leg je linoleum op het zaagplankje.' | Er is geen zaagplankje gebruikt | Het zaagplankje wordt gebruikt, maar op een incorrect manier (verkeerd om of het linoleum is niet correct op het plankje geplaatst) | Het zaagplankje wordt gebruikt en op de juiste manier gehanteerd (linoleum op het zaagplankje) |

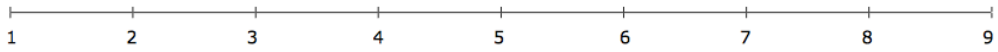
| | | | | |
|---|---|---|---|---|
| 2.3 Hand achter het werk* | 'Je andere hand bevindt zich altijd achter het mesje, je snijdt richting het plankje.' | De hand is niet juist geplaatst (bijvoorbeeld naast of boven het werk) | De hand is juist geplaatst maar wordt niet consequent achter het mesje gehouden | De hand is juist geplaatst en wordt gedurende het uitsnijden achter het mesje gehouden |
| 2.4 Witte vlakken weggutsen | 'Alle witte vlakken en lijnen gutsen we weg.' | De zwarte lijnen en vlakken worden weggegutst | Het wit wordt uitgegutst maar niet consequent (d.w.z. zwarte delen worden meegenomen) | De witte lijnen en vlakken worden weggegutst |
| 3.1 Klein beetje inkt | 'Op de plaat doe je een druppel inkt van ongeveer een euromunt grootte.' | Er is meer inkt gepakt dan nodig (groter dan een eurostuk) | Er is een druppel inkt gepakt, maar dit wordt direct op de roller gedaan | Er is een juiste hoeveelheid inkt gepakt, ter grootte van een eurostuk, en op de plaat gedaan |
| 3.2 Inktrol sissend geluid | 'Het inkt klinkt eerst heel plakkerig, wanneer het een sissend geluid maakt weet je dat je de inkt goed verdeeld hebt. ' | Het inkt inrollen wordt beëindigd terwijl wanneer de plaat nog hoorbaar plakkerig is | Het inktrollen is deels sissend, maar nog ongelijk verdeeld over de plaat | Het inkt inrollen wordt beëindigd wanneer de plaat een sissend geluid maakt. |
| 3.3 krant onder het drukpapier | 'Leg een krantje onder het drukpapier.' | Er is geen krantje onder het drukpapier gelegd bij het afdrukken van de lino | De leerling corrigeert zichzelf en legt alsnog een krantje onder het drukpapier alvorens het afdrukken | Er wordt een krantje onder het drukpapier gelegd voordat de lino op het papier wordt gelegd |
| 3.4 lepel gebruiken bij het afdrukken | 'Voor het aanwrijven van de druk gebruiken we een lepel.' | Er wordt geen lepel gebruikt | Er wordt een lepel gebruikt, maar incorrect toegepast (er wordt geslagen of geklopt met de lepel) | Er wordt een lepel gebruikt op correct toegepast (de lepel wordt gebruikt om de druk aan te wrijven) |

*In het kader van de veiligheid worden deze criteria gecorrigeerd indien zij niet correct worden uitgevoerd. In dit geval worden er 0 punten toegerekend.

## Appendix C

Nummer: Versie:

1. **Omcirkel** het meest bij jou passende getal.
   Het maken van deze linosnede met behulp van de instructievideo kostte mij:




zeer weinig zeer veel

mentale inspanning mentale inspanning

2. Stel dat een docent je nu zou vragen nog een linosnede te maken. Op een schaal van 1 (helemaal niet waar) tot en met 7 (helemaal waar), welk antwoord zou het beste bij jou passen in de volgende drie vragen?

| | (helemaal niet waar) | | | (enigszins waar) | | | (helemaal waar) |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Ik heb er vertrouwen in dat ik in staat ben om een linosnede taak goed uit te voeren. | O | O | O | O | O | O | O |
| Ik voel dat ik er klaar voor ben om op een veilige manier een linosnede te maken. | O | O | O | O | O | O | O |
| Ik durf de uitdaging aan te gaan een voldoende te halen wanneer ik zonder hulp nog een linosnede zou maken. | O | O | O | O | O | O | O |

3. Geef aan hoe zeker je ervan bent om de taak in het vervolg **zelfstandig, zonder hulp van de docent,** goed uit te voeren.
   Geef je zekerheid aan door het cijfer te omcirkelen wat het meest bij jou past:

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|

Kan ik helemaal niet  Kan ik matig  Kan ik zeker weten

Bedankt! Lever dit blad in bij de docent en ruim je spullen op:
Je afdruk leg je in het droogrek.
De linoleum, roller en plaat mogen in de emmer bij de wastafel.
De linoresten gooi je in de grijze bak, het papier in de papierbak.

# Appendix D

Ouders/verzorgers leerjaar 1,

Zoals u wellicht weet worden de beeldende vorming lessen verzorgd in onze nieuwe geschakelde lokalen. Als docent geeft dit ruimte om het beeldend onderwijs beter in te richten en te vernieuwen. Mijn studie onderwijswetenschappen aan de Universiteit Utrecht draagt bij aan het effectief vormgeven van onderwijs. Momenteel doe ik onderzoek naar instructievideo's die we in willen zetten bij ons vak beeldende vorming. Hierbij is medewerking nodig van leerlingen uit leerjaar 1.

**Wat houdt het onderzoek in?**
Het onderzoek vindt plaats in de weken van 2 t/m 20 maart binnen één van de beeldende vorming lessen. Het is een reguliere les, maar de instructie vindt dan plaats door middel van een instructievideo. Voorafgaand aan deze video vult de leerling een vragenlijst in over wat hij/zij al weet over het onderwerp. Vervolgens krijgt de leerling een instructiefilmpje te zien over het maken van een beeldende vorming opdracht. Na het zien van de instructie voert de leerling zelfstandig de opdracht uit. Tot slot worden er aan de hand van enkele vragen onderzocht of hij/zij zich nu bekwaam voelt om de taak in de toekomst zelfstandig uit te voeren.

**Wat is het doel van het onderzoek?**
Het doel van dit onderzoek is om zelfsturend leren bij de leerling te bevorderen, door het aanbieden van instructies in videovorm. Het resultaat van dit onderzoek maakt hopelijk duidelijk hoe deze instructievideo's het beste vorm kunnen krijgen. Ook geeft deze uitkomst aan of de leerling zich bekwaam voelt de taak uit te voeren na het zien van de instructie op video. Hierdoor kunnen we instructievideo's in zetten binnen de les, ontworpen op een voor de leerling juiste manier.

**Privacy en vertrouwelijkheid**
Alle gegevens worden vertrouwelijk behandeld en anoniem verwerkt. De betrokken docent krijgt de antwoorden van de leerlingen niet te zien. De gegevens worden alleen voor opleidingsdoeleinden en voor het vormgeven van instructievideo's gebruikt.
**Bij het onderzoek houden wij rekening met uw toestemming. Gaarne verzoeken wij u in Magister aan te geven dan of u al dan niet akkoord gaat met de leerling participatie in dit onderzoek.**

**Mogelijkheid tot vragen, informatie en toestemming**
Als u nog vragen heeft over het onderzoek of als u op de hoogte gehouden wilt worden over dit onderzoek, kunt u een mail sturen naar onderstaand mailadres.

Met vriendelijke groet,

Mevrouw Maatman
Docent Beeldende vorming Zone.college Doetinchem
mmaatman@zone.college

## Appendix E

**Datum**

17-2-2019

**Onderwerp**
Werving onderzoek
**E-mail**

Mmaatman@zone.college

Beste Directie van het Zone College,

Voor mijn Master Thesis wil ik graag onderzoek doen naar het vormgeven van video instructies binnen de beeldende vorming en techniekles sen. Met name in welk perspectief deze instructievideo leidt tot een verhoogde leeruitkomst. Met dit onderzoek hoop ik bij te dragen aan meer inzicht in de manier waarop we video instructies het best kunnen vormgeven, zodat we dit kunnen ontwikkelen en in kunnen zetten binnen de toekomstige lessen. Graag zou ik dit onderzoek bij de eerstejaars leerlingen van het Zone College willen uitvoeren.

**Wat houdt het onderzoek in?**
Tijdens dit onderzoek bekijken de leerlingen een instructievideo (verschillend in perspectief) over het maken van een linosnede en voeren zij deze taak zelfstandig uit. Het uitvoeren van de opdracht zal begeleid worden door de onderzoekers en duurt even lang als een regulieren beeldende vorming les (circa 80 minuten). Voorafgaand wordt er een vragenlijst afgenomen over de voorkennis van de leerling. Achteraf wordt met een vragenlijst onderzocht of de leerlingen zich competent voelen de opdracht in het vervolg zelfstandig uit te voeren.

**Doelgroep**
De doelgroep omvat alle eerstejaarsleerlingen van het Zone college, van Basis t/m Gemengde leerweg.

**Opbrengst**
De opbrengst van dit onderzoek sluit aan bij de visie van de school, gericht op het zelfregulerend leren. Het resultaat heeft meerwaarde voor innovatie binnen beeldende vorming en techniek en heeft een belangrijke rol binnen het vormgeven van de lessen gericht op de nieuwbouw.

**Privacy en vertrouwelijkheid**
Alle gegevens worden vertrouwelijk behandeld en anoniem verwerkt. De gegevens worden alleen voor onderzoeksdoeleinden gebruikt en niet verstrekt aan derden. Ouders worden ingelicht over het onderzoek en kunnen het aangeven als ze niet willen dat hun kind meedoet. Leerlingen kunnen ook zelf aangeven of ze mee willen doen.

Graag verneem ik of het mogelijk is dit onderzoek op het Zone College uit te voeren in een persoonlijk gesprek,

Met vriendelijke groet,

Malou Maatman

## Appendix F

**Datum**

01-05-2020

**Onderwerp**
Bedankt voor de participatie
**Telefoon**

[telefoonnummer begeleider]

**E-mail**

[emailadres begeleider]

Beste ouder/ verzorger,

Het onderzoek naar het vormgeven van instructiefilmpjes is afgerond. Dankzij uw medewerking hebben we meer kennis over hoe we het beste instructiemateriaal kunnen vormgeven voor de leerlingen van het Zone College. Deze kennis kunnen wij inzetten bij het ontwerpen van nieuwe beeldende vorming en techniekles sen die passend zijn binnen ons nieuwe visie op onderwijs.

Dankzij het ontwikkelen van instructiefilmpjes kan de leerling op een effectieve leerwijze ‘on demand’ instructie opvragen en biedt de docent waar nodig is meer begeleiding op maat.

Hoe het onderzoek precies is verlopen, leest u terug in de komende nieuwsbrief.

Met vriendelijke groet,

Malou Maatman

mmaatman@zone.college

# Appendix G

**FETC-Form**
**APPLICATION FORM FOR THE ASSESSMENT OF A RESEARCH PROTOCOL BY THE FACULTY ETHICS REVIEW BOARD (FERB) OF THE FACULTY OF SOCIAL AND BEHAVIOURAL SCIENCES**

**General guidelines for the use of this form**

1. This form can be used for a single research project or a series of related studies (hereinafter referred to as: "research programme"). Researchers are encouraged to apply for the assessment of a research programme if their proposal covers multiple studies with related content, identical procedures (methods and instruments) and contains informed consent forms and participant information, with a similar population. For studies by students, the FERB recommends submitting, in advance, a research programme under which protocol multiple student projects can be conducted so that their execution will not be delayed by the review procedure. The application of such a research programme must include a proper description by the researcher(s) of the programme as a whole in terms of the maximum burden on the participants (e.g. maximum duration, strain/efforts, types of stimuli, strength and frequency, etc.). If it is impossible to describe all the studies within the research programme, it should, in any case, include a description of the most invasive study known so far.
2. Solely the first responsible senior researcher(s) (from post-doctoral level onwards) may submit a protocol.
3. Any approval by the FERB is valid for 5 years or until the information to be provided in the application form below is modified to such an extent that the study becomes more invasive. For a research programme, the term of validity is 2 years and any extension is subject to approval. The researcher(s) and staff below commit themselves to treating the participants in accordance with the principles of the Declaration of Helsinki and the Dutch Code of Conduct for Scientific Practices as determined by the VSNU Association of Universities in the Netherlands (which can both be downloaded from the FERB site on the Intranet[1]) and guarantee that the participants (whether decisionally competent or incompetent and/or in a dependent relationship vis-a-vis the researcher or not) may at all times terminate their participation without any further consequences.
4. The researcher(s) commit themselves to maximising the quality of the study, the statistical analysis and the reports, and to respect the specific regulations and legislation pertaining to the specific methods.
5. The procedure will run more smoothly if the FERB receives all the relevant documents, such as questionnaires and other measurement instruments as well as literature and other sources on studies using similar methods which were found to be ethically acceptable and that testify to the fact that this procedure has no harmful consequences. Examples of studies where the

[1] See: https://intranet.uu.nl/facultaire-ethische-toetsingscommissie-fetc

latter will always be an issue are studies into bullying behaviour, sexuality, and parent-child relationships. The FERB asks the researcher(s) to be as specific as possible when they answer the relevant questions while limiting their answers to 500 words maximum per question. It is helpful to the FERB if the answers are brief and to the point.

6. **Our FAQ document that can be accessed through the Intranet provides background information with regards to any questions.**
7. The researcher(s) declare to have described the study truthfully and with a particular focus on its ethical aspects.

Signed for approval[2]:
Date:

A. **GENERAL INFORMATION/PERSONAL DETAILS**

1.

a. a. Name(s), position(s) and department(s) of the responsible researcher(s): *M. de Bruin, student, University of Utrecht, Educational science*

2. Title of the study or research programme - Does it concern a single study or a research programme? Does it concern a study for the final thesis in a bachelor's or master's degree course?:

*Single study for the final thesis in a Master's degree course*

3. Type of study (with a brief rationale): *experimental*

4. Grant provider: none

5. Intended start and end date for the study: *1-2-2020 – 8-6-2020*

6. Research area/discipline: Educational science, Cognition.

7. For some (larger) projects it is advisable to appoint an independent contact or expert whom participants can contact in case of questions and/or complaints. Has an independent expert been appointed for this study?: *No*

8. Does the study concern a multi-centre project, e.g. in collaboration with other universities, a GGZ mental health care institution, a university medical centre? Where exactly will the study be conducted? By which institute(s) are the executive researcher(s) employed?: *The study will be conducted at the pre-vocational secondary school Zone College in Doetinchem.*

9. Is the study related to a prior research project that has been assessed by a recognized Medical Ethics Review Board (MERB) or FERB? *No*

[2] The senior researcher (holding at least a doctoral degree) should sign here.

If so, which? Please state the file number: *N.V.T.*

## B. SUMMARY OF THE BACKGROUND AND METHODS

*Background*

1. What is the study's theoretical and practical relevance? (500 words max.):

*Learning from video examples is seen as an effective instructional strategy and recent studies investigated the effectiveness of different design aspects in these video examples. The difference in learning outcome between first-person perspective and third-person perspective on a technical demonstration task had not yet been answered (Fiorella, Van Gog, Hoogerheide, & Mayer, 2017). This study therefore investigated differences in learning outcome on first-person perspective and third-person perspective in video examples. Although it seems that first-person perspective is more beneficial for learning and performance outcome, as aforementioned, it is still unclear to which learning tasks this applies (Boucheix, Gauthier, Fontaine, & Jaffeux, 2018). On the secondary school Zone College in Doetinchem, school leaders focus on student's ownership and stimulate students to take their own responsibility in learning. Therefore, they want to respond to the student need for education on demand. Which actually means, in practice, the role of the teachers shifts from the sage on the stage to a guide on the side. To increase this role of the teacher, instructional videos may be a source of support.*

2. What is the study's objective/central question?:

*the main question is: To what extent does perspective (first-person or third-person) affect performance and learning outcome during a craft task video example for secondary school students?*

3. What are the hypothesis/hypotheses and expectation(s)?:

*This research question can be divided in two sub questions.*

*In order to investigate whether perspective affects learning outcome in terms of performance, the question is: Does video perspective affect performance on the demonstrated task? The results of Fiorella et al. (2017) showed that the third-person perspective group make more mistakes in reproducing a certain kind of task than the first-person perspective group. Also, Lindren (2012) mentioned that first-person perspective leads to a better focus on the important information. Based on the results of these studies, it was hypothesized that the first-person perspective group outperforms third-person perspective group on task performance.*

*To investigate whether perspective affects learning outcome in case of the confidence of reproducing the task the sub question is: Does the perspective affect perceived competence on reproducing the task? Being able to reproduce a task does not mean that students are convinced that they can apply that knowledge for themselves. Because students need to perform the task by themselves after being instructed, it is interesting to see whether the student feels competent in applying the knowledge. Derived from literature, video examples that demonstrate how a problem can be solved can enhance confidence to perform the task (Hoogerheide, Loyens, & Van Gog, 2016). However, if perceived competence is depending on difference is perspective, is not yet known. Derived from the cognitive load theory (Barsalou, 2008; Wilson, 2002), it is expected that third-person perspective leads to more extraneous load, which leads to a decrease of perceived competence. This may*

*support the hypothesis that the first-person perspective group will show higher perceived competence than students in the third-person perspective group.*

*Design/procedure/invasiveness*

4. What is the study's design and procedure? (500 words max.):

*To test the differences in first-person perspective and third-person perspective in an instructional video, a quantitative experiment was conducted. The participants were randomly assigned to one of the two conditions, based on the between-subject factor: the perspective of the instructional video (first-person or third-person).*

*Procedure: The experiment took place in class on different times, according to the existing schedule of the student. One class consisted of eighteen students. The students were randomly assigned with a personal number to their personal laptop. A questionnaire were run with Qualitrics (www.qualtrics.com), which contained three prior knowledge questions and an informed consent. After these questions, a first-person perspective video instruction or a third perspective video instruction was showed. In class, the students were informed about the assignment of reproducing as many steps as possible in the lino-cutting task. Also, the digital form of instruction was explained, which was different from the traditional instruction from the teacher. After the student watched one of the two possible instruction videos, they were asked to reproduce the lino-cutting task. All the material needed for the task was available on their table. The student reproduced the task and the assessor filled in the scoring grid by hand. After completing the lino-cutting task, the student completed the self-efficacy questionnaire and the perceived competence questionnaire on paper*.

5.

a. Which measurement instruments, stimuli and/or manipulations will be used?[3]:

*A lino cutting video example was conducted from two different angles, one video from first-person perspective and one video from third-person perspective. The online Qualtrics questionnaire contained a prior knowledge test with three prior knowledge questions.*

*Mental effort was measured by the mental effort rating scale (Paas, 1992) The 9-point mental effort rating scale ranged from 'very, very low mental effort' to 'very, very high mental effort'.*

*Task performance was measured while students reproduced the craft task with an existing scoring grid (Boucheix et al., 2018), revised in Dutch, using the steps of the procedure of lino cutting instead of the medical procedure steps (see Appendix A).*

[3] Examples: invasive questionnaires; interviews; physical/psychological examination, inducing stress, pressure to overstep important standards and values; inducing false memories; exposure to aversive materials like a unpleasant film, video clip, photos or electrical stimulus; long-term of very frequent questioning; ambulatory measurements, participation in an intervention, evoking unpleasant psychological or physical symptoms in an experiment, denial, diet, blood sampling, fMRI, TMS, ECG, administering stimuli, showing pictures, etc. In case of the use of a device (apparatus) or administration of a substance, please enclose the CE marking brochure for the relevant apparatus or substance, if possible.

*To measure if the students felt that they had mastered the lino cutting skill, a rating scale measured self-efficacy, on a scale of 1 (not at all confident) to 9 (very, very confident; Bandura, 2006).*
*Finally, an existing Perceived Competence Scale for Learning of Williams and Deci (1996) was used to measure if the students felt capable at the end of this experiment, to perform the task himself without guidance or help from other students. Students were asked to scale their confidence in producing and reproducing the task by themselves (see Appendix C).*

b. What does the study's burden on the participants comprise in terms of time, frequency and strain/efforts?: *The participants will be tested in class during a craft course. They are used to lessons of 100 min and this study will only take approximately 50 min.*

c. Will the participants be subjected to interventions or a certain manner of conduct that cannot be considered as part of a normal lifestyle?: *no*

d. Will unobtrusive methods be used (e.g. data collection of uninformed subjects by means of observations or video recordings)?: *no*

e. Will the study involve any deception? If so, will there be an adequate debriefing and will the deception hold any potential risks?: *no*

6. Will the participants be tested beforehand as to their health condition or according to certain disorders? Are there any inclusion and/or exclusion criteria or specific conditions to be met in order for a participant to take part in this study?: *no*

7. Risks for the participants -
   a. Which risks does the study hold for its participants?: *There is a possibility that students will cut in their own hands while conducting the task*
   b. To what extent are the risks and objections limited? Are the risks run by the participants similar to those in daily life?: *These risks are similar to the normal risks during an art class course. In addition, we adapted the scoring grid to ensure students' safety (see * in Appendix B).*

8. How does the burden on the participants compare to the study's potential scientific contribution (theory formation, practical usability)?: *The burden does not differ from a regular art course.*

9. Will a method be used that may, by coincidence, lead to a finding of which the participant should be informed?[4] If so, what actions will be taken in the case of a coincidental finding?: *No*

[4] For instance: dementia, dyslexia, giftedness, depression, extremely low heartbeat in an ECG, etc. If coincidental findings may be found, this should be included in the informed consent, including a description of the actions that will be taken in such an event.

*Analysis/power*
10. How will the researchers analyse the data? Which statistical analyses will be used?*: To investigate whether perspective in an instructional video affects learning outcome, three independent-samples t-tests supposed to be carried out, with task performance perceived competence and self-efficacy as dependent variables and perspective taking as independent variable. However, assumption of normality was violated, therefore Mann Whitney U tests were conducted instead of the aforementioned t-tests.*

11. What is the number of participants? Provide a power analysis and/or motivation for the number of participants. The current convention is a power of 0.80. If the study deviates from this power, the FERB would like you to justify why this is necessary:
*128 participants are necessary for a G* Power of 0.80. Due to the circumstances of Cororna (lockdown of the secondary school), 94 students were able to participate in this study.*

**C. PARTICIPANTS, RECRUITMENT AND INFORMED CONSENT PROCEDURE**

1. The nature of the research population (please tick):
*General population without complaints/symptoms*

2. Age category of the participants (please tick):
*13-15 years*

3. Does the study require a specific target group? If so, justify why the study cannot be conducted without the participation of this group (e.g. minors): *Yes, the target group is Secondary school students. This target group is specifically required due to the theoretical relevance of this study (another population, authentic task environment).*

4. Recruitment of participants -
   a. How will the participants be recruited?: *by informed consent via the communication software Magister.*
   b. How much time will the prospective participants have to decide as to whether they will indeed participate in the study?: *3 weeks*

***4.*** Does the study involve informed consent or mutual consent? Clarify the design of the consent procedure (who gives permission, when and how). Does the study involve active consent or passive consent? If no informed consent will be sought, please clarify the reason: *This study involves active informed consent, in which parents give permission trough the communication software (Magister) for letting their child participate in the study. Also, in the questionnaire prior to the experiment, students gave informed consent themselves.*

6. Are the participants fully free to participate and terminate their participation whenever they want and without stating their grounds for doing so?: *Yes*

7. Will the participants be in a dependent relationship with the researcher?: *No*

8. Compensation
   a. Will the participants be compensated for their efforts? If so, what is included in this recompense (financial reimbursement, travelling expenses, otherwise). What is the amount? *No*

   b. Will this compensation depend on certain conditions, such as the completion of the study?
   *N.V.T.*

**D. PRIVACY AND INFORMATION**

1.
   a. Will the study adhere to the requirements for anonymity and privacy, as referred to in the Faculty Protocol for Data Storage[5]?:
      - anonymous processing and confidential storage of data (i.e. storage of raw data separate from identifiable data): yes
      - the participants' rights to inspect their own data: yes
      - access to the data for all the researchers involved in the project: yes

   b. Has a Data Management Plan been designed? *No*

2.
   a. Will the participant be offered the opportunity to receive the results (whether or not at the group level)?: *no*

   b. Will the results of the study be fed back to persons other than the participants (e.g. teachers, parents)?: *The outcome of the study will be presented to the employee*

      If so, will this feedback be provided at the group or at the individual level? *Individual level.*

3.
   a. Will the data be stored on the faculty's data server?: yes

   b. Will the data that can be traced back to the individual be stored separately on the other faculty server available for this specific purpose?: *No*

      If not, please clarify where will the data be stored instead?: See A

[5] This can be found on the Intranet: https://intranet.uu.nl/wetenschappelijke-integriteit-facultair-protocol-dataopslag

**E. ADDITIONAL INFORMATION**

Optional.

**F. FORMS TO BE ENCLOSED (CHECKLIST)**

- Text (advert) for the recruitment of participants
- Information letter for participant
- Informed consent form for participants
- Written or oral feedback information (debriefing text)
- (Descriptions of) questionnaires
- (Descriptions of) measurement instruments/stimuli/manipulations
- Literature/references

Signature(s):[6] Date and place:

Name, position:

[6] The senior researcher (holding at least a doctoral degree) should sign here.

## FETC-Form References

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*and Social Psychology*, *70*, 767-779. doi:10.1037/00223514.70.4.76

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