Long Story Short: About the Impact of Narratives in Learning

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Abstract

This study is aimed at investigating and testing the differences in motivation and learning between prerecorded lectures that either contain a narrative or no narrative. For that purpose, the study follows a pre-test, post-test and delayed-post-test design, including four different microlectures and an assessment for knowledge and predictors of motivation (I.e., perceived value/usefulness and perceived interest). The study was completed online and, accessible from any device with an internet connection. The first part of the study had 20 Participants and the second part had 15 participants; all participants were from the same sample and students at the University of Twente. Once the data was obtained and analyzed, by using open coding, a paired sample t-test and multiple regression analysis, no difference in learning between the narrative and non-narrative conditions was observed. The findings of the paired sample t-test indicate differences in motivation for one of the specific factors used to assess motivation (Value/Usefulness). Further, the only significant predictor for learning was prior knowledge and this was only the case in the non-narrative setting. As these findings are inconsistent with existing literature, more research in the area of narratives versus non-narratives in the context of education and motivation is needed.

Key words: Narratives, Storytelling, Motivation, Learning, Microlectures, Prerecorded Lectures

Introduction

"The success of learning depends on whether or not the learners are motivated", Filgona et al. (2020, p 16).

This quote from the article 'Motivation in Learning' underlines the importance of motivation. Especially in education, motivation is an important factor. Motivation can have beneficial effects on academic performance, some even view motivation as the most important concept in education (Filgona et al., 2020). Therefore, it is important to focus on introducing and testing learning methods that could increase motivation and therefore lead to better learning outcomes.

Nowadays, lectures are held online more often, and prerecorded lectures are available as learning material (Gysbers et al., 2011). Maintaining student motivation can be challenging, especially in such online learning environments as teachers cannot interact with students the same way they do in traditional lectures (Dumford & Miller, 2018). Lecturers are unable to detect confusion or distress in students via online lectures as usually the cameras and microphones of students are turned off. As teachers cannot notice the struggles of students, they cannot adequately respond to this (eg. Adjust pace, add information, ask questions, provide help) this can lead to frustration in the students and result in loss of motivation (Lodge et al., 2018). Prerecorded lectures provide even less opportunity to interact as online lectures, as a recording is a fixed video and not able to respond to the momentary needs of students. This lack of interactivity in prerecorded lectures is one reason traditional on-campus lectures work better (Conrad, 2019).

Another problem is that prerecorded lectures are predestined for mind-wandering (Conrad, 2019). Mind wandering can be described as a phenomenon where a shift in attention occurs away from the supposed task to unrelated inner thoughts (Conrad & Newman, 2021). Experiencing mind wandering leads to less attention directed at the learning material and

therefore poorer learning outcomes (Conrad, 2019; Wammes et al., 2016). Hence, prerecorded lectures need to be structured interestingly to keep students engaged.

A possible solution to this problem would be to find a way to design and implement prerecorded lectures in a more interesting way to keep students engaged and motivated, even without direct interaction with lecturers. Factors that lead to higher motivation in class include course-specific components (eg. Learning tasks, teaching methods and materials), group-specific components and teacher-specific components, like the teacher's behavior, personality and teaching style (Filgona et al., 2020). This aligns with the findings of Bradbury (2016) that the variability of attention span arises from differences between lecturers, underlining the importance of how information is presented to students. One way to design lectures more interestingly and target the problem of decreasing attention and motivation is the implementation of storytelling. It has been proven by research that presenting information through implementing narratives or 'storytelling' into lectures is more likely to capture and hold the attention and interest of the audience (Kromka & Goodboy, 2019).

Using Storytelling and Narratives

Using narratives or stories in lessons relates to the concepts of gamification. Gamification is an element of the game-based learning approach and is applied to increase students' enjoyment and it successfully increases intrinsic motivation to learn, thereby contributing to long-term engagement and learning (Christopoulos & Mystakidis, 2023; Hartt et al., 2020).

Storytelling can be defined as an element that is used to contextualize information or a text that is characterized by representing the progress from an initial situation to a different situation (Pujolà & Argüello, 2019). Whereas narratives are seen as the telling of a story or moreover a representation of a story, a narrator is not necessarily to tell a story (eg. Drama, film) (Abbott, 2008). Both concepts are therefore closely related and hardly to distinguished.

For this research paper, I will stick to the terms mentioned in the original articles, so both narratives and storytelling are mentioned but mean in the grand scheme the same.

Storytelling has a positive impact on students' perceived enjoyment and is an effective method of learning, especially in the development of language skills compared to traditional teaching methods (Pujolà & Argüello, 2019). In general, stories help organize and remember information. By using narratives as a design element, one can experience an emotional journey and relate these narratives or stories to their own experiences. As stated, by Pujolà & Argüello (2019, p 1), "Narratives (…) make engagement easier and longer lasting".

Furthermore, the use of narratives simplifies the retrieval of information through an improved encoding process (Ecker et al., 2020). This enhancement in encoding information is the result of greater emotional involvement while following narratives compared to non-narratives. Additionally, narratives increase the visualization of the present information and might lead to a feeling of experiencing the story personally. Besides emotional involvement, information retrieval is also fostered through the structural presentation of information that can function as cues if related to general information or experience. Hence, the provided information is associated with an already existing schema (Taylor & Crocker, 2022; Tse, 2007).

Extrinsic and Intrinsic Motivation

As already mentioned, narratives have a positive impact on students' perceived enjoyment this is especially important in the context of motivation. Enjoyment is one of the factors that are related to intrinsic motivation, besides interest and needs (Filgona et al., 2020). Intrinsic motivation is the motivation for an activity itself, hence satisfaction and enjoyment occur through participating in that activity (Ayub, 2010). In the context of education, academic intrinsic motivation is an important factor in terms of achievement, competency and academic learning.

Besides internal motivational factors such as enjoyment, external factors that impact extrinsic motivation are also important. Extrinsic motivation refers to behaviors that function as a means to an end rather than the behavior itself (Ayub, 2010). External factors include the learning environment, teachers, teaching methods and grades (Filgona et al., 2020). Hence, by implementing narratives into prerecorded lectures, intrinsic and extrinsic motivation can be targeted as narratives foster more sustained attention and increase the possibility of listening to more lectures by the same presenter (Kromka & Goodboy, 2019).

Disadvantages of Narratives

Nevertheless, other studies revealed that although narratives as learning approaches can be an alternative to inquiry-based learning and successfully accomplish learning gains in comparison, traditional learning approaches (like inquiry-based learning) achieved higher learning gains (McQuiggan et al., 2008). A reason for this could be the level of difficulty of narratives or stories, as sometimes these stories are difficult to understand (Ntinda, 2018). Additionally, it is questionable if using fictional stories to introduce and teach the content of theories leads to distraction and that the story itself rather than the theoretical aspects are remembered (Landrum et al., 2019). Also, if stories are used too frequently, especially in science-related topics, students might question if the information is based on empirical research or simply storytelling (Landrum et al., 2019).

Current Study

Despite the attention to gamification, to date, research on how narratives, as gamification elements can be used to introduce theoretical concepts in online learning environments, is scarce, as most studies focus on implementation in classroom settings. Even though available findings suggest that narratives have various benefits in the learning process by targeting attention, retention and organizing information, especially in terms of languages (Ecker et al., 2020; Kromka & Goodboy, 2019; Pujolà & Argüello, 2019). The question

remains whether these benefits also apply to learning and gaining more knowledge about theoretical concepts and whether this can be used to raise the potential of prerecorded lectures.

From a theoretical perspective, narratives seem to be a beneficial alternative to increase learning outcomes with only prerecorded lectures as learning material, but the possible disadvantages such as distraction, complexity and overuse have to be considered (Landrum et al., 2019; Ntinda, 2018). Considering this problem research needs to be done to find out if narratives and fictional stories can help understand theoretical concepts better compared to lectures presented through traditional methods. These findings can be useful for further research and for the improvement of online learning environments. Therefore, the current study aims to investigate and test the claims that narratives lead to increased motivation and thus better learning outcomes, specifically in the context of prerecorded lectures, by comparing prerecorded lectures that include a narrative with prerecorded lectures that do not contain a narrative. This leads to the following research question.

"To what extent do prerecorded lectures containing a narrative impact motivation and learning compared to prerecorded without a narrative?"

Based on the stated research question and the available information following hypotheses can be formulated and tested:

H1: Learning is expected to be higher in the narrative condition than the non narrative condition

H2: Motivation is higher in the narrative condition compared to the non narrative condition

H3: Motivational factors are able to predict learning in the narrative condition

Methods

Participants

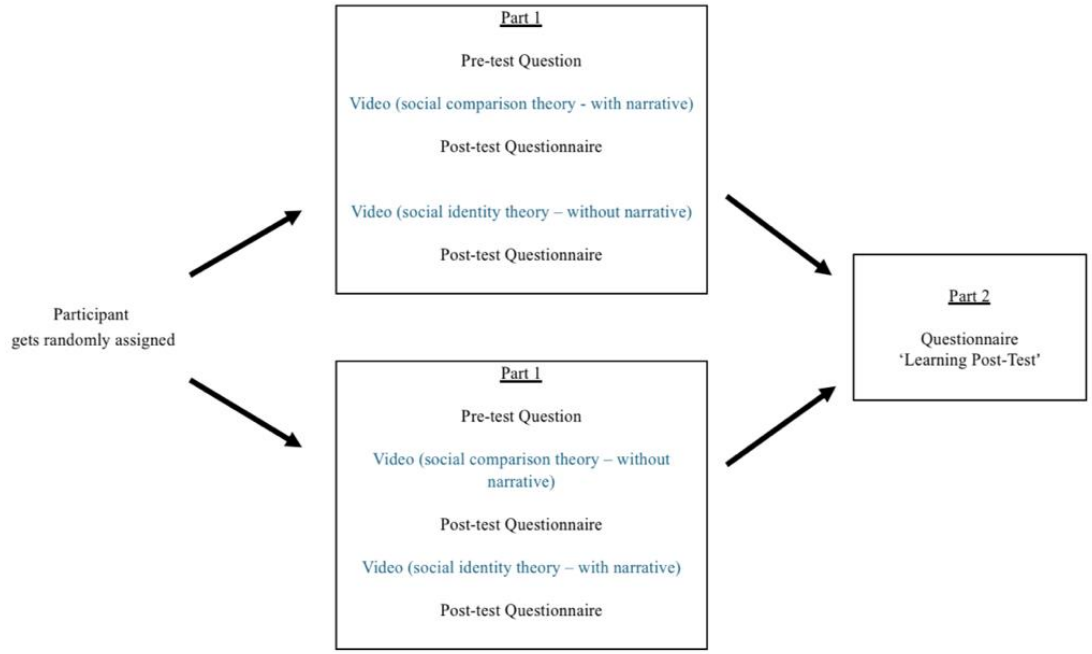
All participants were students at the University of Twente, no specific study program was required to participate. The applied sampling method followed the principle of non-probability convenience sampling. In the first part, a total of 22 students participated. Two students had to be excluded from the study due to incomplete participation. Thus, the final sample consisted of 20 students (4 male, 15 female, 1 preferred not to say). The average age of the participants was 21.9 ranging from 19 to 29 years. In the second part of the Study, 15 out of the initial 20 students participated, and all participants met the inclusion criteria (above 18 years old, sufficient English skills), so no students had to be excluded. This indicates a drop out of 5 participants.

Study Design

The conducted study consisted of two parts. The first part followed a pre-test, intervention post-test design and the second part were a delayed post-test. The intervention consisted of a video with and a video without a narrative, leading to four videos in total. Each participant would watch both a video with and a video without a narrative followed by a test assessing knowledge on multiple levels and an assessment from the intrinsic motivation inventory. Counterbalancing was applied to prevent order effects. A schematic overview of the study design is demonstrated in Figure 1.

Figure 1

Visualization of the Study Design



Note. This figure represents the study design of 'Long Story Short: About the Impact of Game Fiction on Learning'.

Materials

The materials used in this study were two scales from the IMI (Intrinsic Motivation Inventory), that were put together into one online survey, to measure motivational factors. The scales for Interest/Enjoyment and Value/Usefulness are used and slightly adjusted to fit the context of the research study. Other materials used in the questionnaire are the self-produced microlectures about the social comparison theory and the social identity theory. Additionally, open questions about the content of the named theories and the microlectures were included to assess the knowledge of participants. Therefore, the questionnaire included a measurement for "Interest/Enjoyment", "Value/Usefulness" and "Knowledge".

Domain Knowledge

Knowledge was measured on two different levels paying attention to reproduction of information and applying knowledge (e.g. naming the theoretical concept vs. explaining the theoretical concept = knowledge vs. understanding). This was done to assess overall

knowledge in a more meaningful way. In total Knowledge was measured three times during the study, in the pre-test phase and the post-test and delayed post-test phase. The measurement for pre-test measured Prior Knowledge and was assessed before watching the microlectures with an open question asking participants to write down what they know about the psychological theories. The measurement of Knowledge for the post-test measured Learning and was assessed immediately after watching the microlectures by replying to the open question "Please write down what can you remember from the microlecture you saw?". The measurement of Knowledge for the delayed post-test measured Sustained Learning and was assessed in the second part of the study (five days after completing the first part) by using the same open question for measuring learning. Each individual answer was assessed and coded under knowledge and understanding, the coding scheme will be further explained in the data analysis section.

Intrinsic Motivation Inventory

Intrinsic Motivation was measured on two different levels using the Intrinsic Motivation Inventory (source). Motivation was assessed with the measurements for Interest/Enjoyment and Value/Usefulness. Both measurements were measured by their eponymous scale from the Intrinsic Motivation Inventory.

The scale for the variable interest/enjoyment consists of 7 items, with 2 reversed items and the scale for the variable Value/Usefulness consists also of 7 items, without reversed items. Both scales were rated with a three-point Likert scale indicating 'Not True at all', 'Somewhat True', or 'True'. A high score would therefore indicate a high experience of interest and enjoyment and a high experience of value and usefulness while watching the microlectures. Some of the items were adjusted to the context of the study, for example, 'I enjoyed watching the microlecture' and 'I think watching the microlecture is useful for learning', respectively. The reliability for the scale 'interest/enjoyment' was considered

insufficient (0.3) whereas The reliability for the scale of ‘value/usefulness’ was considered high (0.9). The full scale of the measurements for Interest/Enjoyment and Value/Usefulness can be found in Appendix A.

Microlectures

In total four different videos were recorded. The microlectures about the social comparison theory with and without narrative and the microlectures about the social identity theory with and without the narrative component (Festinger, 1957; Taijfel, 1974). The microlectures differ in their length, ranging from five to eight minutes depending on the type of the video, as the microlectures including the narrative are longer due to more non-theoretical content. Besides the inclusion of the narrative, there are no other differences in the content of the microlecture. A link to an example video can be found in Appendix B.

Data analysis

Before analyzing the collected data, the reliability of the questionnaire was assessed. This was done to ensure that the questionnaire was reliable. The reliability was measured with Cronbach’s alpha. The main analysis conducted was open coding for the answers to the open questions to make them quantifiable as they represent the dependent variable. To ensure that the open coding was objective, the coding followed a specific scheme, paying attention to the percentage of named concepts. The scores ranged from 0 to 4. 0 represents 0% completeness of the answers, 1 represents 0-25%, 2 represents 25-50%, 3 represents 50-75% and 4 represents 75-100%. Hence, to achieve a coding score of 4 for both codes at least 8 out of 10 concepts from the social comparison theory need to be named and explained (9 out of 11 concepts for the narrative version), and at least 6 out of 8 concepts from the social identity theory (7 out of 9 concepts for the narrative version).

Secondly, multiple paired sample t-tests are conducted to investigate the differences in learning between the non-narrative condition and the narrative condition and the differences in prior knowledge and motivation. Before deciding on the paired sample t-test the data was tested based on five assumptions, to ensure the assumptions were met and the t-test valid (LibGuides: SPSS Tutorials: Paired Sample T Test, o. D.). All assumptions were met as the dependent variable is at a ratio level, and the samples are related, which means all subjects participated in both groups. The data comes from a random sample, with no outliers between the related groups and the data is normally distributed ($p > 0.05$). The outcome of the normality testing is visible in Table 1. Furthermore, two multiple regression analyses are used to investigate the relationship between the dependent variable 'learning' (knowledge/ understanding) and the independent variables (Interest/enjoyment, Value/usefulness and prior knowledge) for each condition. The collected data is analyzed with SPSS.

Table 1

Normality test.

	Kolmogorav-Smirnov			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Learning	.16	20	.200	.92	20	.11

Note. Significant correction by Lilliefors.

Procedure

In order to participate, participants had to follow a link to the online survey and consent after being informed about the study. The informed consent can be found in Appendix C. Participants needed to fill out two online questionnaires, with a delay of five days, students who signed up over the SONA system received a reminder to fill out the second questionnaire on time.

In the pre-test phase, participants are asked to fill out the demographics and a questionnaire had to be filled out by the participants to assess their current knowledge about the two psychological theories that will be presented in the microlectures. After filling out the questionnaire the first microlecture is presented. The first microlecture is about the social comparison theory, participants are randomly assigned to either Video A (narrative version) or Video B (non-narrative version). Based on which microlecture about social comparison theory participants saw, participants need to watch either video D (without narrative) or Video C (with narrative) about the social identity theory. In this way, participants partake in both conditions. Each time after watching the microlecture participants had to fill out a short questionnaire, targeting knowledge and motivation. At the end of the first survey is a written reminder to take the second survey five days later. In this delayed-post-test, students have to fill out the same questionnaire from the pre-test and post-test again, without filling out demographic information, and answer a follow-up question, "What do you remember from the video", to investigate if the presented theory was understood and remembered. With this setup, it is possible to investigate if students benefit more from lectures that include narratives or if students benefit more from the traditional lecture approach, without narratives. This process should not take longer than 25-30 minutes and 10 minutes, respectively.

Results

Below the results of the paired sample t-test and the two multiple regressions are reported, together with a representation of the descriptive statistics of the computed variables that were relevant for the data analysis process visible in Table 2. The variables Interest/Enjoyment and Value/Usefulness were computed based on the individual item scores obtained from the eponymous scales. In the process of computing all variables, attention was paid to differentiating between the scores obtained from the narrative and non-narrative

conditions. This was done to ensure the research question “To what extent do prerecorded lectures containing a narrative impact motivation and learning compared to prerecorded without a narrative?” can be answered.

Table 2

Mean and Standard devaluation of prior knowledge, learning posttest, learning delayed posttest, interest/enjoyment and value/usefulness, both conditions.

	Narrative		Non-Narrative	
	Mean	Standard deviation	Mean	Standard deviation
Prior|knowledge|	0.74	0.51	0.75	0.55
Learning	0.75	1.35	1.62	0.96
Sustained|Learning	1.15	0.96	1.05	0.92
Interest|Enjoyment	1.89	0.30	1.80	0.29
Value|Usefulness	2.51	0.40	2.14	0.52

Note. N= 17 for Non-Narrativ, N = 20 for Narrative.

Multiple paired samples t-test were performed to evaluate whether there were differences between the narrative and non-narrative condition specifically to answer Hypothesis 1 *“Learning is expected to be higher in the narrative condition than the non-narrative condition”* and Hypothesis 2 *“Motivation is higher in the narrative condition compared to the non-narrative condition”.* In total five different pairs were constructed and included in the t-test (prior knowledge, learning, learning post-test, interest/enjoyment, value/usefulness).

The outcome indicates that the perceived value/usefulness in the non-narrative condition (M = 2.14, SD = 0.13) is significantly lower than the perceived value/usefulness in the narrative condition (M = 2.53, SD = 0.43), t(16) = -3.33, p = <.005. All other outcomes,

comparisons of prior knowledge, learning, learning post-test, and interest/enjoyment are not significant, as demonstrated in Table 3.

Table 3

Paired sample t-test.

		Mean	Standard deviation	T	df	Sig. (2-tailed)
Pair 1	Prior|Knowledge|NN – Prior|Knowledge|N	.01	.60	.09	19	.927
Pair 2	Learning|NN – Learning|N	.03	1.12	.11	16	.915
Pair 3	Sustained|Learning|NN – Sustained|Learning|N	.11	.44	.86	10	.410
Pair 4	Interest|Enjoyment|NN – Interest|Enjoyment|N	-.06	.36	-.68	16	.507
Pair 5	Value|Usefulness|NN – Value|Usefulness|N	-.38	.47	-3.33	16	.004

Note. NN = Non-Narrative, N = Narrative.

Following the paired sample t-test, two multiple regression analyses were conducted, to investigate if 'interest/enjoyment' and 'value/usefulness' and 'prior knowledge' function as predictors for 'learning' and to answer hypothesis 3 *"Motivational factors can predict learning in the narrative condition"*.

The first multiple regression analysis targets 'learning' for the non-narrative condition. Overall, the model was significant $F(7,276) = 3$, $p = .004$, and explains 62.7% of the variance in learning, with an adjusted $R2$ of 0.54 indicating that at least one predictor significantly affects learning. Based on the coefficient's outcomes visible in Table 4 'interest/enjoyment' and 'value/usefulness', do not statistically significantly contribute to the model whereas 'prior

knowledge' does statistically significantly contribute to the model t(3.735) = 0.761, p < 0.005. Hence, the following equation is not fully suitable to predict the variable 'learning'.

$$\text{Learning} = 3.447+1,557*1 -2.128*2+0.427*3$$

Table 4

Outcome multiple regression analysis presenting coefficient for equation.

Model	B	SD	β	t	p
(Constant)	3.447	1.069		3.225	.007
Prior knowledge	1.557	.417	.761	3.735	.002
Interest/Enjoyment	-2.128	.706	-.642	-3.013	.010
Value/Usefulness	.427	.416	.232	1.027	.323

Note. DV= Learning

The second multiple regressions target the narrative condition. The total variation in learning for the narrative version can be explained with 'prior knowledge', 'interest/enjoyment' and 'value/usefulness' by 11%, with an adjusted R2 of -.06. The model is not statistically significant F(0,66) = 3, p > 0.005. Hence, the following equation, based on the coefficient's outcomes presented in Table 5, is not suitable to predict the variable 'learning'.

$$\text{Learning} = 0.4+0.929*1+0.351*2-0.058*3$$

Table 5

Outcome multiple regression analysis presenting coefficient for equation.

Model	B	SD	β	t	p
(Constant)	-1.678	2.545		-.659	.519
Prior knowledge	.430	.639	.163	.673	.510
Interest/Enjoyment	1.1283	1.202	.288	1.067	.302
Value/Usefulness	.206	.924	.060	.222	.827

Note. DV= Learning

The results will be summarized and discussed further in the following section.

Discussion & Conclusion

Based on the results following conclusion can be drawn, including narratives in video lectures did not lead to an increased learning outcome compared to lectures without narratives. Hence, the first hypothesis "*Learning is expected to be higher in the narrative condition than the non-narrative condition"* is rejected, as no significant difference in learning between the conditions was found.

This is contradictory to the beneficial implications of the literature mentioned in the beginning. However, further literature suggests that contradicting results occur more frequently Ecker et al. (2020) summarized some of these contradicting findings, suggesting that the context in which the narratives are applied is important. Depending on the context narratives are inferior or superior to non-narratives, or both methods are equally effective when it comes to persuasion (Dunlop et al., 2009; Greene & Brinn, 2003). The findings of Ecker et al. (2020) also suggest that narratives do not necessarily enhance retrieval and that integration of new knowledge to existing knowledge functions more effectively using non-narratives. Considering the merely beneficial effects mentioned in the beginning, more research in the field of narratives versus non-narratives is needed, to resolve the problem of contradictions.

In terms of motivation, the results were mixed, as one out of the two motivational factors (Value/Usefulness) was significantly higher in the narrative condition. This indicates a difference in motivation between the conditions. However, just one of the motivational factors used for measuring intrinsic motivation leads to a difference therefore it cannot be said that motivation in general is higher in the narrative condition. Hence the second hypothesis

"Motivation is higher in the narrative condition compared to the non-narrative condition" can not be clearly rejected nor accepted.

The result that Enjoyment does not differ between narratives and non narratives is surprising, as it directly contradicts the findings of Pujolà and Argüello, (2019). A possible solution for the different outcomes regarding the effect of enjoyment, could be the use of different measurement methods. In the original study of Elkılıç and Akça (2008), enjoyment is measured by assessing motivation in learning English, referring to preferred activities and attitude towards the use of storytelling. In the current study, the measurement for enjoyment was related to intrinsic motivation towards a specific activity, hence the scales and therefore the results might not be accurately comparable. Another reason why the motivational factor of interest/enjoyment was not significant could be explained by the unreliability of the scale. The reliability test only revealed a Cronbach's alpha of .324 which is highly unreliable (Tavakol & Dennick, 2011). This could also explain why the motivational factor of value/usefulness was significant as the used scale was highly reliable. Although, it remains unclear why the reliability of the two scales differ significantly from each other as the scales are taken from the same inventory (IMI).

Additionally, one could argue about the non significant results further. One reason for a non-significant outcome during testing could be that the effect might exist in the predicted size but is overlooked as the evidence in the sample is not sufficient enough (Mehler et al., 2019). Another reason for "null findings" is that the effect is smaller than expected even close to zero and is therefore considered absent. However, it has to be acknowledged that a significant effect was found with the value/usefulness factor, despite a small effect size and small sample size, that was the same for every other factor.

Another, more simplified reason could be that the motivational reasoning of participants was different. Leading to the outcome that interest/enjoyment is not the reason

why participants were intrinsically motivated by the narrative, which is still contracting the to the original literature. Therefore, it is important to acknowledge and discuss non-significant findings to avoid publication bias and to improve the reliability of scientific findings (Mehler et al., 2019).

The outcomes of the paired sample t-test investigating the difference in motivation are in line with the outcomes of the multiple regression analyses. Overall, the model for the narrative condition was significant, however looking at the individual predictors reveals that only prior knowledge predicts learning to a significant extent. Hence, both motivational factors, interest/enjoyment and value/usefulness were not significant. The same findings occurred in the narrative condition. This leads to the conclusion that the third hypothesis *"Motivational factors are able to predict learning in the narrative condition",* has to be rejected as the motivational factors are not significant and therefore do not function as predictors.

An interesting point to discuss is the predictor of prior knowledge as this factor is the only significant predictor for learning in the non narrative condition, especially because prior knowledge was not a significant predictor for learning in the narrative condition. A possible explanation is that the new information was linked to the prior knowledge and therefore to the already existing scheme participants had, which lead to better retrieval and therefore an enhanced learning effect (McClelland et al., 2020). However, findings of Green (2004) suggest that this effect should also occur with narratives. These findings suggest that prior knowledge about the topic of the narrative leas to greater transportation into the story and thus more emotional involvement which would correspond with the suggestion of Ecker et al. (2020) that higher emotional involvement enhances information retrieval. It can be argued that this effect only applied to the non narrative condition and not to the narrative condition due to possible violation of external realism meaning the presented information is inconsistent

with the beliefs of the participants, so it could not be linked directly to prior knowledge and an already existing scheme (Busselle & Bilandzic, 2008). However, in this case it remains unclear whether the narrative was inconsistent with current beliefs or not, as the narratives itself did not hold additional theoretical information. Hence it can be assumed that possible inconsistent beliefs occurred through the presentation of the narrative.

As all three hypotheses can not be accurately accepted, the overall research question "To what extent do prerecorded lectures containing a narrative impact motivation and learning compared to prerecorded without a narrative?" can be answered with the following statement "Prerecorded lectures containing a narrative do not have a significant impact on motivational factors or learning compared to prerecorded lectures without a narrative, overall prerecorded lectures with or without narrative do not have a significant impact on motivation or learning."

Limitations

As mentioned previously, the lack of statistical power in the sample size is a limitation (Mehler et al., 2019). Additionally, results from a smaller sample size are hard to generalize or seen as representative (Vasileiou et al., 2018). Hence, in this study, the sample size is a serious limitation to point out, as it can impact the findings of significant or non-significant results. Another limitation of this study is the uncontrollable environment in which participants performed (Greifeneder, 2012). As the questionnaire was accessible online, participants could participate from anywhere at any time. There was no control if the environment was distracting or not, for future research it is therefore advisable to conduct similar studies in a more laboratory setting, as participants should be able to focus on the given topic without being disturbed. Originally, the online availability was intended to attract more students to participate due to easy access, unfortunately this strategy did not have the expected impact.

Future Research

In general, future research about non-narratives and narratives in the context of education is needed to clarify when and under which circumstances differences occur and resolve the problem of contradicting results. By resolving this issue, it will be known when narratives are a helpful learning tool and when narratives should not be used. Especially, the relationship between narratives and motivation should be investigated more in-depth to figure out what motivation factors are effective in terms of narratives and which factors are not effective. In that way, motivation can be targeted more specific. This is important as motivation is proven to be a crucial factor in learning and if narratives influence motivation successfully, narratives can be seen as an indirect predictor of learning outcomes. Also, when investigating differences between narratives and non-narratives in retrieving information, more longitudinal studies are required that extend the scope of five days to support the argument about long lasting engagement and therefore learning (Pujolà & Argüello, 2019). Further, more research is needed to ensure the reliability of either non-significant or significant findings.

Final Conclusion

Currently, this study supports the findings that there is no difference between non-narratives and narratives used in learning as the results are not significant. As these findings are contradictory to current literature, it can be argued that narratives do not have the beneficial effects on learning and retention as expected and suggested by literature. If narratives cannot provide the suggested benefits, alternative, more suitable and effective interventions should be researched and applied in the context of education, especially online learning.

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Appendix

Appendix A - Example Block of Questions

Social comparison theory

Q10

Please indicate which microlecture you watched.

- ◯ Video A (social comparison theory - without narrative)
- ◯ Video B (social comparison theory - with narrative

Q11

Please write down what you can remember from the microlecture.

Please answer the following questions related to interest/ enjoyment truthfully.

	Not true at all	Somewhat true	Very true
I enjoyed watching the microlecture.	◯	◯	◯
This activity was fun to do.	◯	◯	◯
I thought it was boring to watch the microlecture.	◯	◯	◯
The microlecture did not hold my attention at all.	◯	◯	◯
I would describe the microlecture as very interesting.	◯	◯	◯
I thought this activity was quite enjoyable.	◯	◯	◯
While I was watching the microlecture, I was thinking about how much I enjoyed it.	◯	◯	◯

Please answer the following questions related to value/ usefulness truthfully.

	Not true at all	Somewhat true	Very true
I believe watching the microlecture could be of some value to me.	○	○	○
I think watching the microlecture is useful for learning.	○	○	○
I think it is important to do because it can help me understand concepts.	○	○	○
I would be willing to do this again because it has some value to me.	○	○	○
I think watching the microlecture could help me achieve my learning goals.	○	○	○
I believe watching the microlecture could be beneficial to me.	○	○	○
I think watching the microlecture is an important activity.	○	○	○

Appendix B – Links Example Videos

Link video Social comparison theory without narrative:

https://youtu.be/MU8LwDkSsFk

Link video Social comparison theory with narrative:

https://youtu.be/5q_ZRck4AlY

Link video Social Identity Theory without narrative:

https://youtu.be/0QGSWVQMDWY

Link video Social Identity Theory with narrative:

https://youtu.be/1rnP7ViY5yA

Appendix C – Informed Consent

Welcome to my research study!

You are invited to participate in a research study that is being conducted by a Bachelor student from the University of Twente. The purpose of this study is to investigate if students' benefit more from traditional lectures or lectures that include narratives in terms of remembering theoretical concepts. This form will provide you with information about the study and what your participation will involve. Please read it carefully and take time to consider whether or not you wish to participate. If you have any questions, please do not hesitate to contact me (email below) or my supervisor Judith ter Vrugte.

Requirements
If you want to participate, you need to be a student at the University of Twente and older than 18. Further, you are required to understand and write English. If you do not adhere to these requirements, please do not continue and close this window!

Procedures
If you agree to participate, you will be asked to complete an online survey. The survey will take approximately 15-20 minutes to complete. This only survey is the first step of the study and assess your prior knowledge about certain psychological theories. After filling out the first survey, you have to watch two different videos, microlectures about the psychological theories, which will take approximately 10 minutes. After watching the videos, another online survey similar to the first one needs to be completed to end the first part of the study. The second part of the study will take place five days later where the same online survey has to be filled out again. This is done to receive information on how much you remember from the videos. The first survey also includes a few demographic questions that we kindly ask you to answer.

Risks and Benefits
There are no foreseeable risks associated with participating in this study. However, you may experience some distress or anxiety due to the practice of testing your knowledge about the presented theories. The study is approved by the Ethics Committee of the Faculty of Behavioural, Management and Social Sciences at the University of Twente. Students of the University of Twente who participate through SONA Systems will receive SONA Credits after completing the study.

Confidentiality
Your confidentiality will be strictly maintained throughout the study. Your responses will be kept confidential and anonymous. Your responses will only be accessible to the research team. Only anonymised data will be reported, and no individual will be identifiable in any publications or presentations that result from this study.

Voluntary Participation

Participation in this study is voluntary. You may choose not to participate, and you may withdraw from the study at any time without penalty and negative consequences. By clicking the “I consent" button below, you acknowledge that you have read and understood the information provided above, and that you freely and voluntarily agree to participate in this study.