



## **LEARNER-CONTENT INTERACTION IN FLIPPED CLASSROOM MODEL**

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### **Abstract**

The article deals with the interaction of elementary school students with online educational videos. Half-yearly survey was conducted in mathematics lessons pupils in the eighth grade. During the experimental teaching was flipped classroom teaching model, where students watch educational instructional video before school lessons. During class when the teacher uses activation teaching methods that build on the content of the educational video. It turned out that there is a correlation between the average length of time that students watched videos and length instructional videos. Students watched a video about three times the length of their time. Additionally was monitored a number of playback of educational videos. Here it shows a slightly declining and fluctuating trend. For some video, especially towards the end of the experiment, the number playback are low due to preservation the measured correlation. This suggests that some students stopped to watch educational videos at the end of the experiment or accelerated video playback.

### **Keywords**

flipped classroom, learner-content interaction, educational videos, elementary school

### **Introduction**

All around as what we can know is changing dramatically, and pedagogy too. With new technologies and increased understanding of cognitive development, teachers have to be open to changes and improvements in their classroom instruction. One pedagogical response to the growing interest in technology in the classroom is the flipped classroom.

## Flipped classroom model

The concept of Flipped / Flip / invert classroom appeared in educational research a few years ago. Due to the limited amount of research there is little consensus on the complete definition of this concept. Lage (2000) defines the inverse of the class as follows: "Upside class means that the events that traditionally took place in the classroom, takes place outside the classroom and vice versa." This explanation captures the reasons for use of terminology flipped classroom. This definition would mean that the flipped classroom represents only change the arrangement of learning activities. Most research deals with the inverse class activity methods in the classroom. There are quoted on a student-oriented learning theory based on the works of Piaget (1967), Vygotsky (1978). The flipped classroom most uses asynchronous online courses, which are shared via the web interface study materials, most educational videos. From this point of view, the inverse class rather extension of the curriculum, rather than just a new way of working. Since 2013, the academic work is the concept of inverse model class.

Parent category to flipped classroom is blended learning, which can be translated as computer-aided instruction. Skater (2012) defines a "blended learning" as an educational program in which the student learns partly by on-line learning materials and individually checked their education and partly educated in school under the supervision of a teacher.

Flipped classroom uses implementation rotation-model in the learning process when certain procedures are repeated cyclically which means:

- The teacher outside the school prepares on-line study materials instead of interpreting the new school curriculum.
- Students will get acquainted with the new curriculum through on-line learning materials, and thus control their own education.
- The teacher in school activities prepared in accordance with activation methods of teaching, during which students discuss and practice the new curriculum.
- During lessons are used personalized and activization methods of teaching.

So it works with the definition of flipped classroom as methods of teaching, which is cycled through the above points (1-4). Study of George Mason University and a Pearson company defines four pillars on which the reciprocal class built:

- Teachers introducing reciprocal teaching class in its sole discretion, which combine different methods and forms of teaching according to students' needs.
- Teaching is focused on students. The teacher becomes a creative activity in which students are actively manage their education.
- The teacher uses appropriate on-line learning materials to help students understand curriculum.
- The teacher's role is irreplaceable, while providing feedback and individual approach to students in the learning process.

Furthermore, these studies describe the increase in interest the flipped classroom and presents qualitative data, according to which the majority of teachers and students with this way of teaching satisfied. In his dissertation Strayner (2007) describes the effect of the flipped classroom on learning environment on college students in course of statistics, which compares with the study environment in the traditional method of teaching. Works of Moravec et al. (2010) and Day and Foley (2006) dealing with academic performance of students using the flipped classroom model. In both studies, flipped classroom students achieved significantly better results than students taught by traditional method. So far it is not known to many research papers flipped classroom of an elementary school. This method involves interchanging typical classroom tasks with homework tasks. Instead of taking class time to demonstrate math processes, teachers record their lectures and assign students to watch the lecture videos as homework. The flipped model allows active learning to take place in the classroom during class time. This technique allows teachers to be present when students run into difficulties as they apply what they are learning to solving problems; instructors can hear and correct misunderstandings the moment they occur.

Today students can call net generation spend a lot of time connect on internet. Using technology also needs to be conducive in the environments in which students complete their work. Furthermore, students must have the necessary motivation to benefit from this technique. Some studies have explored the benefits of the flipped classroom, the study environments of students, and student motivation for using technology. The goal of this study was to map student interaction with instructional videos during their home preparation on lessons.

## Types of Interactions

Before the explosion of online teaching and learning, Moore (1989) offered classification of interactions in education. His three-part interaction scheme included:

- learner-instructor
- learner-learner
- learner-content interaction

Learner-instructor interactions establish an environment that motivate learners to understand the content. This type of interaction is “regarded as essential by many educators and highly desirable by many learners”. Learner-learner interactions take place “between one learner and other learners, alone or in group settings, with or without the real-time presence of an instructor”. Some studies show that this type of interaction is a valuable experience and learning resource (Vrasidas & McIssac, 1999). Learner content interaction is defined as “the process of intellectually interacting with content that results in changes in the learner’s understanding, the learner’s perspective, or the cognitive structures of the learner’s mind” (Moore, 1989). Although learner-content interaction is well recognized as a type of interaction, there is not much discussion about learner-content interaction in the current literature. This is probably because different contents may require different interaction patterns, and, thus, it is difficult to have a generalized discussion about such interaction. Given the technology-mediated nature of

online education, learner-interface interaction is considered to be another important type of interaction. Hillman, Willis and Gunawardena (1994) point out that this type of interaction occurs between the learner and the technology used for online education. She further points out that it can be one of the most challenging types of interaction due to the fact that people have not experienced having learner-interface interaction in their traditional classroom education. There are some other types of interactions that are not as widely discussed such as vicarious interaction and learner-self interactions. Moore (1989) argues that it can be treated as an essential part of the learner-content interaction. However, scholars coming from a sociocultural perspective which emphasizes self-talk as a means of internalizing strategies witnessed on a social plane would likely differ with Moore on this issue. It is not the focus of this study to explore which classification is correct or easier to identify. Through documenting some of the literature about interaction, researchers hope to demonstrate what instructional activities and technologies are used in practice to enhance interaction in general and how students and instructors feel about these interactions. For the purposes of this article, will be discuss the Learner-content and learner-interface interactions. Wagner (1994) use term interaction for communicative relationships between human beings. For learner content-interaction, where is today content is mostly represent online educational materials is used term interactivity. The majority of student time, in all forms of education, is consumed by interactions with a variety of educational content. In distance education, this has meant study with texts and electronic resources, often supplemented created study guides. Current technologies provide a wide variety of media alternatives for creating content for student interaction. This study focus on the time spent by students during homework, watching educational videos and their subsequent activity in the classroom, which is used by educational flipped classroom model.

## Methodology

For examining the interaction between students and online instructional video was used long term classical pedagogical experiment. During this experiment was also investigated the academic performance of pupils. We worked with the control and experimental group (always one class of the same school year). Pedagogical experiment was attended by 54 students, 27 in the control and experimental class. The control group of pupils progressed by traditional teaching methods, especially new exposition of the new curriculum took place during lessons. The experimental group had available educational videos that was specially created for the purpose of the experiment. For distribution educational videos were created websites ([prevracenatrída.cz](http://prevracenatrída.cz)). There were also explain, what flipped classroom teaching method is. Students watched video during home preparation. They had the opportunity to comment each video and discuss the problematic part of the matter on the social network. Brief summary of the topic and explanation of the problematic parts was performed in classes. Emphasis was placed on independent work and deepening knowledge. At the beginning of the experiment the control and experimental group went through a didactic test (pre-test). In the middle of experiment students pass intermediate test. At the end of the experiment both groups then passed another didactical test (post-test). Twenty-five educational videos were created that cover the mathematics curriculum first half of the eighth grade. The researcher was also a math

teacher for the experimental group. Partial results of the research have been published (Špilka & Maněnová, 2014).

During the pedagogical experiment was recorded using an algorithm frequency and duration playback of educational videos on the web [prevracenatrída.cz](http://prevracenatrída.cz). The number of visitors and the playing time of each video was recorded by students of the experimental group.

## Results

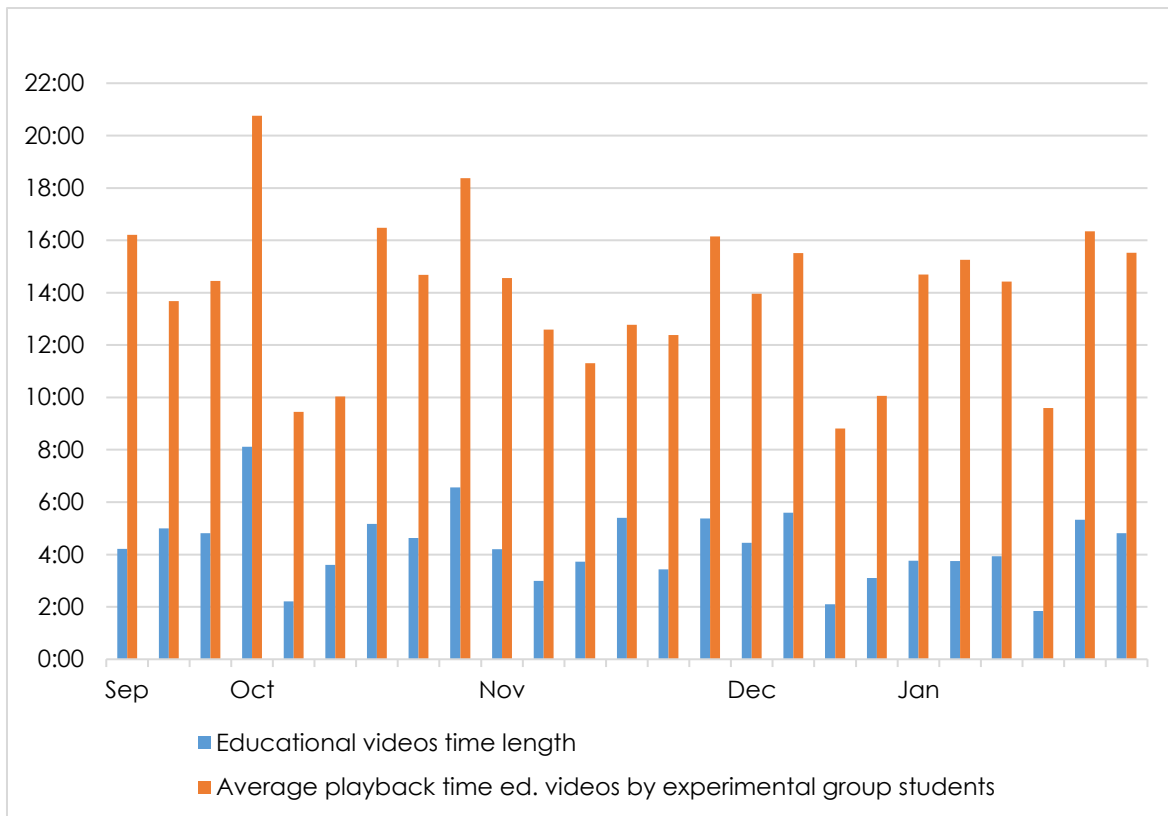
We were interested in the relationship between the average time video playback and length videos. We assume that if students use educational videos for self, should confirm the relationship between the playback time and total length videos. Based on this reasoning, we have set the following hypothesis:

*H: We assume the dependence between the video length and the average playback time of each video by experimental group student.*

Table and chart compares the length of the instructional video and an average playing time of each video for the experimental group of students.

	<b>v1</b>	<b>v2</b>	<b>v3</b>	<b>v4</b>	<b>v5</b>
Educational videos length	4:13	5:00	4:49	8:07	2:13
Average playback time	16:13	13:41	14:27	20:46	9:27
	<b>v6</b>	<b>v7</b>	<b>v8</b>	<b>v9</b>	<b>v10</b>
Educational videos length	3:36	5:10	4:38	6:34	4:12
Average playback time	10:02	16:29	14:41	18:23	14:34
	<b>v11</b>	<b>v12</b>	<b>v13</b>	<b>v14</b>	<b>v15</b>
Educational videos length	3:00	3:44	5:24	3:26	5:23
Average playback time	12:36	11:19	12:47	12:23	16:09
	<b>v16</b>	<b>v17</b>	<b>v18</b>	<b>v19</b>	<b>v20</b>
Educational videos length	4:27	5:36	2:06	3:06	3:46
Average playback time	13:58	15:31	8:49	10:04	14:42
	<b>v21</b>	<b>v22</b>	<b>v23</b>	<b>v24</b>	<b>v25</b>
Educational videos length	3:45	3:56	1:51	5:20	4:49
Average playback time	15:16	14:26	9:36	16:21	15:32

**Tab. 1:** Time data about video length and average playback time



**Fig. 1:** Compare educational videos length and average playback time

Because normality tests clearly did not confirm the normality of the data examined (normality of the data was verified by Kolmogorov Smirnov test, D'Agostino Skewness tests, D'Agostino and D'Agostino Kurtosis Omnibus) for testing we used Spearman's test. We tested at a significance level  $\alpha = 0.05$ . Spearman correlation coefficient was 0.7998. It was then proved a relationship between the educational video time length of the video and the average playback time of each video for students of experimental groups (Fig. 2).

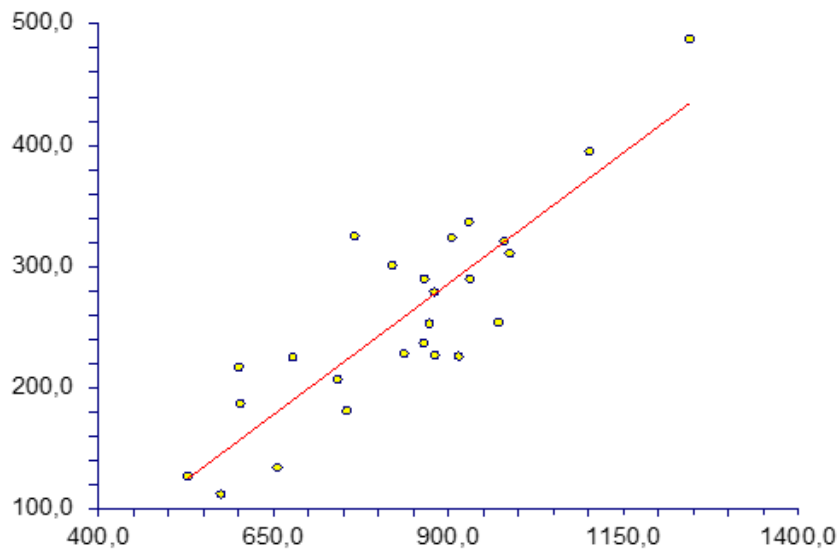


Fig. 2: Correlation educational videos length and average playback time

We also monitored the number of plays each videos. In Figure 3 we see a graph with a slightly downward trend.

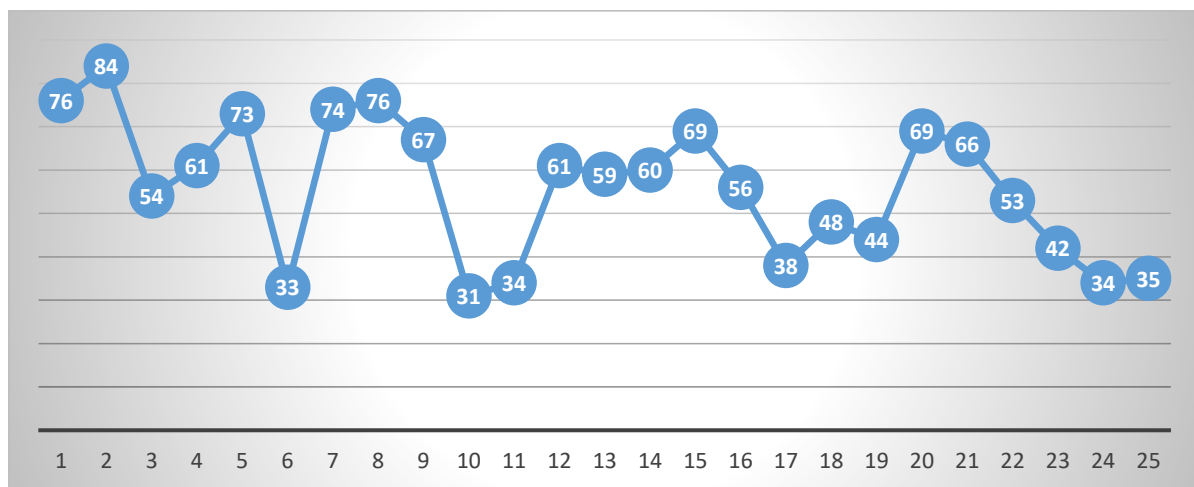


Fig. 3: Number of plays each video

## Discussion

Research issues related to learner-content interaction is focus on the development and evaluation of new forms and tools of learner-content interaction. The results will be used to assist developers and tutors in both creating and modifying existing objects and in selecting and assigning the most appropriate sets of learning activities based on learner-content interaction. An added benefit of the rich resources available will be the growing capacity to design multiple paths through content based on a variety of learning needs and preferences. Finally, the shared environment of web-based education allows for rapid inclusion of student-created content and its incorporation into current and subsequent versions of education courses. This research works

with small research sample, so conclusions cannot be generalized. Then there is excluded the interaction of students, which constitute an integral part of the educational process. However, it demonstrates one of the ways to explore independent pupils' homework.

## Conclusion

This study shows how pupils of elementary schools working with online educational materials. In the case of educational videos correlates exists between the length of instructional videos and playing time. If we look at the frequency playback instructional videos and these data we put into the relationship, and the average length of video playback time can partially understand the behaviour of students during homework. For some video, especially towards the end of experiment, the numbers of the playback are low due to preservation the measured correlation. This suggests that some students stopped watching educational video during the experiment. Some students watched a video approximately three times their length. For further research would be useful to find out whether the time spent with video affects their academic performance.

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