



Cecilia von Heijne

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Dr Cecilia von Heijne, Senior Curator
The Royal Coin Cabinet, National Museum of Economy
PO Box 5428
SE-114 84 Stockholm, Sweden
cecilia.vonheijne@myntkabinettet.se

The Royal Coin Cabinet, National Museum of Economy in Sweden, has introduced a concept called *flipped museum* with the purpose to bridge between museum and school. The idea of *flipped museum* has emerged from the *flipped classroom* model.

The museum's first *flipped project* deals with entrepreneurship and has students in elementary and secondary school as main target group (ages c. 13 to 18). The basic idea is that students and teachers will be able to see two introductory films through the museum's domain www.flippatmuseum.se. This means that the more conventional "guide tour" takes place outside the museum. The films are supplemented by quizzes.

When the students come to the museum's entrepreneurship exhibition, they will work actively with problem-solving on six themes based on their understanding from the films. After the visit to the museum, teachers can choose to give assignments to the students. On the domain www.flippatmuseum.se, three essay topics are provided for the students to work with at home or in the classroom.

The Royal Coin Cabinet, National Museum of Economy in Sweden, has introduced the concept of the *flipped museum* based on the fundamentals of the *flipped classroom*. This paper presents the background of the *flipped museum* concept as well as the museum's intentions and expectations with its first *flipped project*.

The Royal Coin Cabinet is a modern museum with a long history. It is one of Sweden's oldest museums with collections dating back to the 1570s. The museum has a special interest in history of money, history of finance, economic and social history and the art of medals.

The collections are part of Sweden's national heritage. They consist of more than 600,000 objects from around the world, representing all periods of time. The largest and most important part of the collection is comprised of coins, but also contains other means of payment, e.g. paper money, ethnographical money and share certificates. Another substantial part consists of medals.

The museum has exhibitions on coin history, treasure troves, medals, today's world economy, banks and savings together with a specially made mini-version of the museum for children. The Royal Coin Cabinet produces temporary exhibitions and programs for mainly children and young adults. The museum has given a series of lectures about economics over the last couple of years. The speakers are researchers, former and present governors of the Riksbank (Sweden's central bank), journalists and leaders of trade and industry.

The concept of flipped classroom

The *flipped classroom*, also called *flipped teaching*, is a form of blended learning, meaning it includes on-line resources as well as IRL teaching. It is a generic term for providing parts of the teaching on-line, for example through a movie, podcast or blog post. This can be done in different ways: either the teachers create their own material and make it available on the internet for their students; or teachers refer students to materials that someone else has

produced. The purpose is to make more time available in school for activities such as discussion, debate and problem solving.

The approach was developed in the early 1990s by Eric Mazur, Professor of Physics at Harvard University. He found the conventional teaching situation unsatisfactory, of lectures from the teacher's desk followed by homework, when dealing with large groups of students. For the teacher this method creates a distance from the students and lack of time to help them with actual problem solving. Mazur realized the advantages of *flipping* the teaching. He gave students the assignment to watch recorded lectures on-line at home. At the university the students were divided into groups that worked together with problem solving. Mazur's role shifted from an emphasis on pure lecture from the teacher's desk, to be more coaching and in dialogue with the students. Mazur calls the method Peer Instruction [Mazur, 1997; Mazur group, www.mazur.harvard.edu].

After Professor Mazur's introductory work, the *flipped classroom* has gained support among many educators. One of the principal representatives today is the Khan Academy founded by Salman Khan. He was initially a financial analyst who became involved in teaching through the Internet by chance. Khan's cousin, who lived in another city, needed help with schoolwork in mathematics and science. Khan's solution was to record his assistance to his cousin and post it on YouTube. His posts quickly gained many followers and his teaching videos became highly appreciated. People who, for example, had difficulties in comprehending their school assignments, or needed to refresh their knowledge, found new opportunities to learn through Khan's videos on YouTube. Khan decided to develop the e-learning concept and started Khan Academy in 2008 [www.khanacademy.org].

In 2014 the Khan Academy has millions of followers worldwide. They offer lectures in diverse disciplines, including Social Science, Economics, Art History, Physics, and many others. The emphasis is, however, on mathematics and science. In the United States some teachers base their *flipped classroom* teaching on Khan Academy material. For example, students are given the assignment to watch a certain lecture from Khan Academy at home. This changes the teacher's role in the physical classroom and increases the possibility to concentrate on work promoting application of learning. Salman Khan stresses the importance of the Khan Academy for global and democratic aspects. Through on-line resources education is available for more people that otherwise have difficulties accessing it because of disabilities, lack of funding for higher education or for those living in remote regions. For example, a teenager in Calcutta who is born in a poor family must work to contribute to their family's livelihood during the daytime. Since the internet is becoming increasingly available, today it is possible that this teenager, who does not have the opportunity to participate in any regular education, can continue to study through Khan Academy [Khan 2011, YouTube video]. It is considerably cheaper to get an internet connection than to fund several years of study at high school or university. A concept related to the *flipped classroom* is that of the Massive Open On-line Course (MOOC). This is a term for on-line courses that are available for all interested without any charge, or for a small fee. The courses usually consist of videos and interactive assignments. The idea was introduced by Massachusetts Institute of Technology MIT but has evolved and is today practiced by many institutions and organizations across the world.

One of the benefits that have been highlighted with the *flipped classroom* is flexibility enabling students to learn at different rates and in various ways. Through on-line videos it is possible to go back and watch an episode several times if necessary. Many students prefer

learning in a quiet environment at home where their perception is not disturbed by other impressions.. But there are also critics to *flipped classroom*: one opinion is that there is reluctance among students to spend more time doing work at home; another is that teachers need to be prepared to take care of students who miss the preparatory work at home so that they still will be able to keep up with the course; another aspect is that it is difficult for teachers to produce high-quality teaching materials. Technology can also be an obstacle if there is a problem with internet access caused by limited internet speed, high costs, availability in remote areas etc [Herreid & Schiller, 2013].

In Sweden there is an interest in the *flipped classroom* and it is a concept that most teachers have heard of. It is used by some teachers but its widespread implementation in Swedish schools is hindered by the fact that many teachers do not have the time or technical knowledge to produce on-line material. However, the technical conditions for the students to take part of a *flipped classroom* program are generally good. Basically all students have access to the internet, as most have access at home to computers or via their mobile smartphones. Schools also offer access to computers, and most classrooms have internet access and equipment for projection.

The Royal Coin Cabinet's first *flipped project*

The Royal Coin Cabinet is a part of the central agency National Historical Museums. The government provides instructions [SFS, 1997:1172] and an annual letter of appropriations to guide the central agency National Historical Museums activities. The government has instructed to the central agency to focus on children and young adults and therefore the Royal Coin Cabinet has decided to base its latest project on the curriculum for primary and secondary schools.

In Sweden a recent reform of the curriculum for primary and secondary schools has increased the emphasis on entrepreneurship. The curriculum states:

“The school should stimulate pupils’ creativity, curiosity and self-confidence, as well as their desire to explore their own ideas and solve problems. Pupils should have the opportunity to take initiatives and responsibility, and develop their ability to work both independently and together with others. The school in doing this should contribute to pupils developing attitudes that promote entrepreneurship” [Curriculum for the compulsory school, preschool class and the recreation centre 2011:11].

“The school should contribute to students developing knowledge and attitudes that promote entrepreneurship, enterprise and innovative thinking. As a result the opportunities for students to start and run a business will increase. Entrepreneurial skills are valuable in working and societal life and for further studies” [Curriculum for the upper secondary school 2011:6].



Images from the exhibition "Entrepreneurship – nothing is easy, but everything is possible"

The Royal Coin Cabinet's project "Entrepreneurship – nothing is easy, but everything is possible" has students in elementary and secondary school as main target group (ages c. 13 to 18). The project launched in March 2014 consists of three distinct parts and each part can be found on the internet at www.flippatmuseum.se (which also links to www.flippedmuseum.com).

The first part of the project is informational and there are two films of ten minutes each. The first film discusses what entrepreneurship is, the second film presents the industrial and economic history of Sweden in relation to entrepreneurship. The films are supplemented by two quizzes. The intention is that the teacher can assign students to watch the videos at home, or show them in the classroom. The purpose of the films is to provide an introductory understanding of entrepreneurship.

The second part is the visit to the museum. Students are initially divided into groups to undertake activities that promote exploration of entrepreneurial stories, facts and experiences through discussion and group dynamics. A permanent exhibition at the museum contains six themes which the students work with in their groups:

1. What is entrepreneurship?;
2. Timing;
3. Sweden in the world & the world in Sweden;
4. Motivation;
5. Think outside the box;
6. Industrial geniuses.

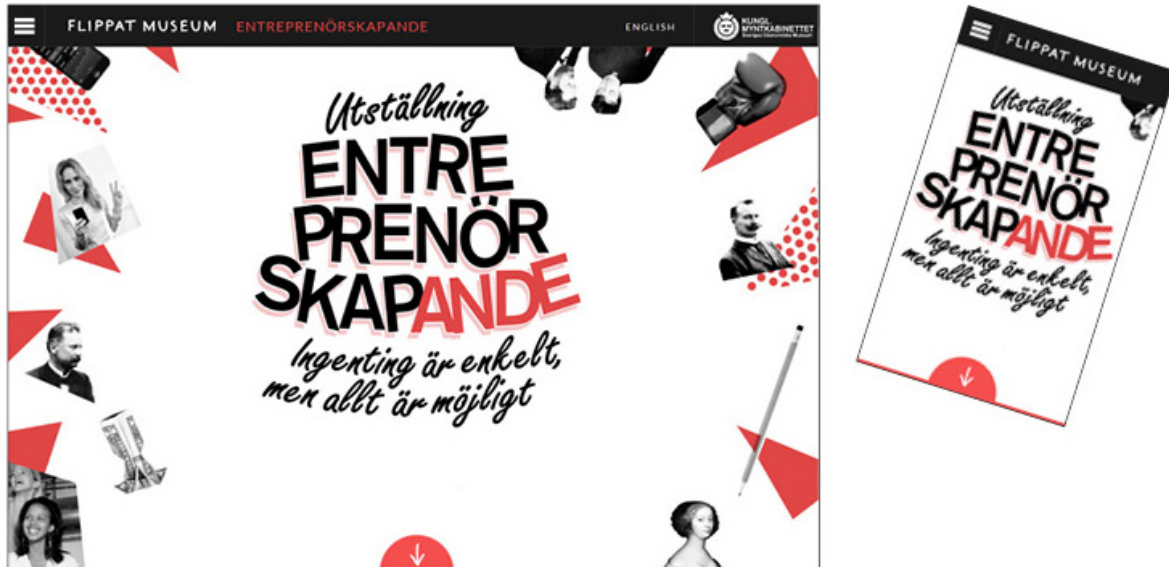
These themes illustrate a number of issues, such as how Swedish entrepreneurs relate to a globalized world and take responsibility for development of social and environmental issues. The exhibition stresses questions regarding entrepreneurship from a historical and migratory perspective. After the group activity the students are gathered in an arena that is built for the exhibition. In the arena an audience response device is used for highlighting personal choices and issues concerning values. The students are exposed to a number of questions and they vote with the response devices. The aim is for the students to reflect on themselves and their personal skills.

The third and final part of the project takes place in school. Teachers can choose to give the students the assignment to explore one of the three themes "I am an entrepreneur", "I know an entrepreneur" or "I know of an entrepreneur". The assignment can be delivered in text as essays or as a short film.

With the project "Entrepreneurship" the Royal Coin Cabinet wants to promote understanding of the entrepreneurship concept, demonstrate a range of entrepreneurs in society, and identify various entrepreneurial characteristics and to make students aware of their own entrepreneurial capacity. The objective is also to discuss what significance entrepreneurs have had for creating present-day Sweden and reflect on what influence they will have in the future. The project will promote inspiration and hope and give a sense of a positive future that we all are a part of creating, and the exhibition will call for reflection on democracy and equality values.

The concept *flipped museum*

Working with videos, on-line information and close communication with schools is hardly a novelty for museums. So how can the concept *flipped museum* actually contribute to learning? A main advantage the Royal Coin Cabinet sees is when communicating with schools the term *flipped museum* is useful because it is clearly linked to *flipped classroom* and most teachers have a positive understanding of the concept *flipped classroom*. This means that they will have a preconception of the content in *flipped museum* without any further explanation.



The website www.flippatmuseum.se is adaptive and ready to be used on computer screens, tablets and smartphones.

On a practical level implementation of the domain www.flippatmuseum.se will mean that:

- The museum will be able to work in a new educational way with schools. Information and learning are provided before the visit. At the museum the visit is geared towards activities, group dynamics, discussions and problem solving.
- The Royal Coin Cabinet is a museum that specializes in economics and monetary history. It is the only museum of its kind in Sweden and is located in Stockholm. Through the *flipped museum* it will be possible to reach schools that are not located in the region. Naturally physical visits to the museum are encouraged and it is believed that through *flipped museum* the awareness of, and interest in, the museum will increase. However, it is possible for schools to use films and assignments without having to visit the museum which gives the project national reach.
- Many of the topics covered by the Royal Coin Cabinet are relevant to students at age *c.* 13 to 18 years. Schooling during this stage is very goal-oriented and the students' work is regularly evaluated and examined. For many teachers, it is difficult to find time to visit museums "for fun". Therefore it is important that the material which the museum provides for schools clearly relates to the curriculum and clarifies the purpose and working methods for the teachers. This is fundamental at www.flippatmuseum.se.
- There are many interesting topics that the Royal Coin Cabinet could deal with, but which are not represented in the exhibitions. Several of these are well suited to be presented in lectures. For the museum it can be practical, and pedagogically and financially beneficial, to provide information and knowledge about these topics through the *flipped museum* platform rather than to integrate them into the exhibitions. An ideal situation from the perspective of the Royal Coin Cabinet, would be to provide in-depth information on a specific theme through an on-line lecture before a visit, which is followed up with an educational program at the museum.
- The *flipped museum* platform can allow the Royal Coin Cabinet to quickly produce and communicate educational material on current topics, which is an important task for a National Museum of Economy.
- The Royal Coin Cabinet can, through the *flipped museum*, assist teachers in addressing economic issues in a new and inspiring way.

Are there any dangers with *flipped museum*? It is important that the digital access to information does not make the physical visit to the museum uninteresting or unnecessary. The on-site visit is something which can never be fully covered with on-line resources alone.

The flipped museum is not an "easy way out" in the sense that by providing information on-line, the number of educators or specialists at the museum can be reduced. On the contrary, it demands a knowledgeable and dynamic staff that is able to produce projects and lead activities.

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