

## THE USE OF TABLETS IN TEACHING POLITICAL ECONOMY AT CZECH UNIVERSITIES

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### **Abstract**

The rapid development of tablets allows for their use in all areas of human activity. The objective of this paper is to express the range of possibilities for using tablets as smart technology in teaching political economy, as well as the percentage and structure of the students at Czech universities who use tablets in lessons of economic theory and what benefits the use of tablets brings them. The authors found that most students in all monitored fields of study used tablets in the school and found them affordable.

### **Introduction**

The study of technical fields related to proficiency in foreign languages ensures plenty of job offers and higher wages for university graduates in the Czech Republic. In fact, the chance of students who graduate in technically-oriented fields at universities to find work is up to seven times higher than that of graduates from humanities schools. This is due to both the traditional focus of Czech companies on manufacturing and industry, as well as the unprecedented development of Information and Communication Technologies (ICT), which today controls the operation of virtually all companies and organizations. A great demand for people who are able to develop and program information systems and for people who are able to work with these systems has thus emerged on the labour market in the Czech Republic.

According to estimates of the recruitment agency Grafton Recruitment (2018), there is a shortage of several tens of thousands of Information Technologies (IT) experts in the Czech Republic today. One of the reasons for this is the large number of emerging IT centres that provide IT services around the world from the Czech Republic or are focused on the actual development of technology. Apart from IT specialists in virtually all areas of focus (from networking, to security, through programming, big data, data analysis, and artificial intelligence), graduates in fields such as construction, mechanical or electrical engineering, project management, economics, or logistics and transport management do not have to worry about finding work either (Grafton Recruitment, 2018).

The teaching of political economy in both fields of study takes place in the form of lectures that include both the history of economic learning as well as microeconomics and macroeconomics. From a methodological point of view, it is mainly of a descriptive nature, but students can use tablets to familiarize

themselves with related texts that complement the construed material of the course or illustrate the lecture through references/links to complementary literature (charts, images, tables, etc.).

It holds true that graduates from both fields of study (Operations and Economics – OAE and Operations and Administration – OAA) use ICT a lot in their future work, whether it be in companies or government organizations. At this time, tablets can become a significant helper both in their practise at the workplace and in further education, whether it is formal or non-formal. Working with tablets already in their studies at university helps graduates to further orient themselves in ICT at specific workplaces in companies.

The goal of the study was to express the range of possibilities for using tablets as smart technology in teaching political economy, as well as the percentage and structure of the students at Czech universities who use tablets in lessons of economic theory and what benefits the use of tablets brings them. A sub-goal was to express the differences between male and female university students studying at Faculty of Economics and Management, Czech University of Life Sciences in Prague (FEM CULS in Prague) in their approach to working with tablets; whether there are any and if so, what they are.

### **Theoretical Background**

Meeting the needs of today's always-on-the-move society has led to the rapid development of information and communication technologies and the widespread use of technological advances, such as laptops, tablets and smartphones, connected with each other through networks and software (Alhassan, 2016; Zidney & Warner, 2016). We are living at a time when laptops and desktops are being replaced by smartphones and tablets as the primary personal computers (Bonnington, 2015; Gillett, 2012). For example, "In recent decades, so-called mobile learning or m-learning has become a new paradigm in education as a consequence of technological advances and the widespread use of mobile devices to access information and for communication" (Castillo-Manzano, Castro-Nuno, Lopez-Valpuesta, Sanz-Díaz, & Yñiguez, 2017, p. 326). Furthermore, "As an advantage to traditional computers, tablet computers are mobile, which allows for anytime-anywhere learning" (van der Ven, Segers, Takashima, & Verhoeven, 2017, p. 201). Mobile handheld devices (e.g., tablets) can provide interactive instruction opportunities in teaching and learning as well as meaningful experiences for students and teachers (Sessoms 2008; Terras & Ramsay, 2012). Additionally, evolving mobile technologies contribute to seamless personalized learning, advanced interactivity in the classroom between teachers and students or among students, and a wide variety of instructional content and applications (Alelaiwi et al., 2015; Haßler, Major, & Hennessy, 2015; Song, Wong, & Looi, 2012).

The use of tablets as modern means of smart education is increasingly expanding not only at top foreign universities but also at Czech universities. Liaw, Hatala, and Huang (2010) state that the fast spread of tablets and similar technologies, together with inexpensive and accessible internet connection, has significantly altered the nature of university education. Several studies

focused on tablet usage at universities have shown that these technologies positively contributed to improving the quality of the teaching process (Li, Pow, Wong, & Fung, 2010; Steinweg, Williams, & Stapleton, 2010). At the same time, Dickerson, Williams, and Browning (2009) characterize current students as advanced users of modern technologies.

### **Share of Women Among IT Workers**

The latest data from 2015 show that women made up less than a tenth of the 150,000 people employed in IT fields in the Czech Republic (Hrabica, 2018). In 1995, the difference was not so abysmal. In this year, the statistics showed that there are almost 60,000 IT professionals in the Czech Republic; there was one woman for every two men in the industry. In almost a quarter of a century, the ratio has changed significantly. The share of IT professionals in the total number of employed persons in the Czech Republic has tripled since the 1990s, mainly in favour of men. In the IT profession there are currently the least number of women in programming where the representation of women is only about 3 % (Hrabica, 2018).

### **The Reasons for Women's Lower Interest in IT Studies**

There are many myths circulating in society that have an impact on the fact that such few females choose IT disciplines, one of which is the claim that the field is more suitable for boys. The mothers of female students, who often co-decide on the future profession of their daughters, sometimes belong to a generation for which IT disciplines had been a great obscurity. Reserved attitudes can also be seen in primary schools, where there are no personalities who could help girls in overcoming the fear of devoting themselves to IT. As Hrabica (2018) states, in practice, the IT profession requires independence, organization and discipline so that the IT professional is able to find his/her own way to solve a given problem and carry it out with precision. According to the Headmaster of the Private Secondary School of Information Technology in Prague, Martin Vodička, sometimes even the best men working in IT lack this ability, while girls have it as a natural attribute.

For female students, choosing a field in IT has its specific advantages. If there are few women in the industry, they have less competition in the labour market. For some positions, women are actually preferred because of their better ability to communicate with customers and business partners.

There have long been very few female students of information disciplines, and they are actually coddled in schools and later in companies. In 2015, nearly 22,000 students studied IT disciplines in the Czech Republic; women made up less than a fifth (Hrabica, 2018). According to university teachers, female IT students are more often above the average and very conscientious both in their studies and in project management (Ministry of Education, Youth and Sports, 2018).

The average representation of women in information technology in the European Union is less than 16 % (Eurostat, 2017). The most feminized IT sector in the EU is boasted by Romania, where women make up 28 %. This is more than in Austria (27 %) and Ireland (22 %); in the Czech Republic, it is not even 10 %. The country with the least women working in IT is Slovenia,

where women make up less than 4 % (Eurostat, 2017). According to the calculations of the agency NPR (2014), the number of women working in computer-focused fields in the US grew faster than the number of men from the 1960s to the 1980s. The peak was 1984, when 37 % of women studied computer science in the US. However, this figure has again fallen to less than twenty percent (NPR, 2014).

Researchers report that while the use of technology has increased more research is needed. For example:

- University lecturers use a wide range of technologies when teaching and there has been much research into how particular technologies are adopted. (Shelton, 2017, p. 303)
- Familiar and new technologies require a teacher to be able to confidently identify the pedagogical potential for effective learning and teaching. (Savage, 2016, p. 533)
- Considering the many technologies that can support students' work nowadays, studies describing specific practices are still needed in order to understand the many possibilities and constraints that can emerge from the use of these tools in the field of education. (Monjelat, Mendez, & Lacasa, 2017, p. 265)

Furthermore:

Findings indicate that, currently, very little attention is specifically given to the knowledge that teachers need to foster early literacy through the use of technology. This is due to multiple factors, including the conviction that many new technologies (e.g., tablets) are not used much in schools. (Voogt & McKenney, 2017, p. 69)

However, we must realize that for many families in the Czech Republic (and other new EU member states), tablets and other ICT are not easily affordable. Currently, the average wage in the Czech Republic is EUR 1,250, which is approximately three times less than in Germany, for example (EUR 3,703; Eurostat, 2018). This fact has a significant impact on the level of use of smart technologies by students and teachers at various universities, according to the social structure of the students and also their teachers, in whose case age also plays a significant role.

## **Material and Methods**

### **Methodology**

In order to realize the research goal stated in the introduction of the article, the following hypothesis was established:

University students, both men and women, use tablets (as an example of smart technology) in their studies on political economy to an equal extent, because they not only facilitate their current studies, but also contribute to their better integration into economic practice in the future.

The following procedure was established for the successful verification of the scientific hypothesis.

Participants were chosen from a lecture on Macroeconomics that took place in the summer semester of 2018 on 2 March, which was attended by 123 students in the fields of OAE and OAA. This lecture was selected for the research on the use of tablets in teaching the subject of political economy because both of the fields discussed are among the main fields of study at the Faculty of Business and Economics at the Czech Technical University in Prague and have decisively the largest share of students in the faculty. All 123 students that were present at the lecture volunteered as respondents for the research.

The questionnaire included six research questions. The questions asked about the gender of the students, their ownership of tablets, how often they use them in their studies on economics, what purpose they use them for, the affordability of tablets and whether the student would welcome the possibility of using them to a greater extent in studies on political economy.

The questionnaire survey method was the basic method used in the research. Subsequently, for the analysis of the questionnaires, first mathematical methods (relative frequency) were used and then comparative analysis was completed to express the difference in the responses of women and men. These differences between the responses of men and women were subsequently tested using the chi-squared test at a significance level of  $\alpha=0.05$ . Also, the descriptive method was often used. The conclusions of the article and the implications for tablet manufacturers and further research were subsequently created by synthesizing the knowledge gained from the analysis of the questionnaire survey.

## **Results and Discussion**

### **Research Question No. 1**

The first survey question was “Are you a man or a woman?” Of the 123 students present, 80 were women (i.e., 65 %) and 43 were men (i.e., 35 %). The gender structure of the present students of both disciplines has long corresponded to the typical composition of students at the Faculty of Business and Economics of the Czech Technical University, where about two-thirds of students are women, regardless of whether it is full-time or combined studies. The higher proportion of women participating in the survey is explained by the fact that the survey was carried out among the students of economic fields with a higher proportion of women, due to the nature of the future profession for which the students were preparing. However, in these fields of study, too, ICT subjects are significantly represented.

### **Research Question No. 2**

The majority of students who filled in the questionnaire believe that tablets are affordable for all students or at least for those who work. According to experiences of teachers, the majority of students currently have at least a part-time job. The gender difference (almost 20 %) is evident in the answers to the question as to whether tablets are available for all students or just for those

who also work in addition to their studies (see Table 1). This may be due to the different consumer spending structure that exists between women (e.g., fashion) and men, the generally higher incomes of men in employment or due to income received from parents (*The Brussels Times*, 2018). According to the experience of the study authors, in the subconscious of the Czech public the life role of the man as the breadwinner of the family is still accepted, and parents have brought up by their young men accordingly.

Table 1

*How Do You Assess the Affordability of Tablets?*

Answer	Women		Men	
	Number of students	In %	Number of students	In %
They are affordable for all students	25	31.65	21	50
They are affordable for all students who are already working	48	60.75	17	40.48
They are not affordable for students	6	7.6	4	9.52

**Research Question No. 3**

Essentially, men and women were the same in the structure of their answers to the questions of whether students own a tablet, whether they are planning to buy one in the near future, or whether they neither own one nor plan to buy one. From a gender perspective, **their answers as a percentage are practically the same** (see Table 2).

Table 2

*Do You Own a Tablet?*

Answer	Women		Men	
	Number of students	In %	Number of students	In %
Yes	29	36.25	17	39.53
No, but I plan to buy one in a year	9	11.25	4	9.3
No, and nor do I plan to buy one	42	52.5	22	51.17

To verify the statistical significance of this statement, the null hypothesis was established: There is no statistically significant difference between genders in the answers to the question, “Do you own a tablet?”

Therefore, the conditions for using the chi-squared test were fulfilled (see Table 3). Testing was performed using the chi-squared test, and at a significance level of  $\alpha=0.05$  the null hypothesis was confirmed, and it was found that there is no statistically significant gender difference in answer to the question, “Do you own a tablet?” ( $p$  value=0.909).

Table 3

*Chi-Square Tests*

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.191 <sup>a</sup>	2	0.909
N of Valid Cases	123		

**Research Question No. 4**

On the other hand, the answers of the male students (men) were quite different from those of female students (women) to the question "How often do you take a tablet to school with you?" (See Table 4.) According to the answers to this question, men take tablets to school with them more often than women do. To verify the statistical significance of this statement, the null hypothesis was established: There is no statistically significant difference between genders in the answers to the question, "How often do you take a tablet to school with you?"

Table 4

*How Often Do You Take a Tablet to School With You?*

Answer	Women		Men	
	Number of students	In %	Number of students	In %
Always	4	10.52	4	19.05
Sometimes	17	44.74	9	42.86
Never	17	44.74	8	38.09

Therefore, the conditions for using the chi-squared test were fulfilled (see Table 5). Testing was performed using the chi-squared test, and at a significance level of  $\alpha=0.05$  the null hypothesis was confirmed, and it was found that there is no statistically significant gender difference in answer to the question, "How often do you take a tablet to school with you?" ( $p$  value=0.645). The reason as to why this may be can be clarified by the analysis of the following research question No. 5 (see Figure 1 and Figure 2).

Table 5

*Chi-Square Tests*

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.876 <sup>a</sup>	2	.645
N of Valid Cases	59		

**Research Question No. 5**

According to the answers to the question, "For what purpose do you use a tablet at school?" most students use tablets mainly for displaying materials for lectures or seminars or for their own entertainment, regardless of whether they are men or women.

Female students also use tablets to find additional information for their studies. For women, this use of tablets even surpassed their use for entertainment, which was actually the third most common use for women.

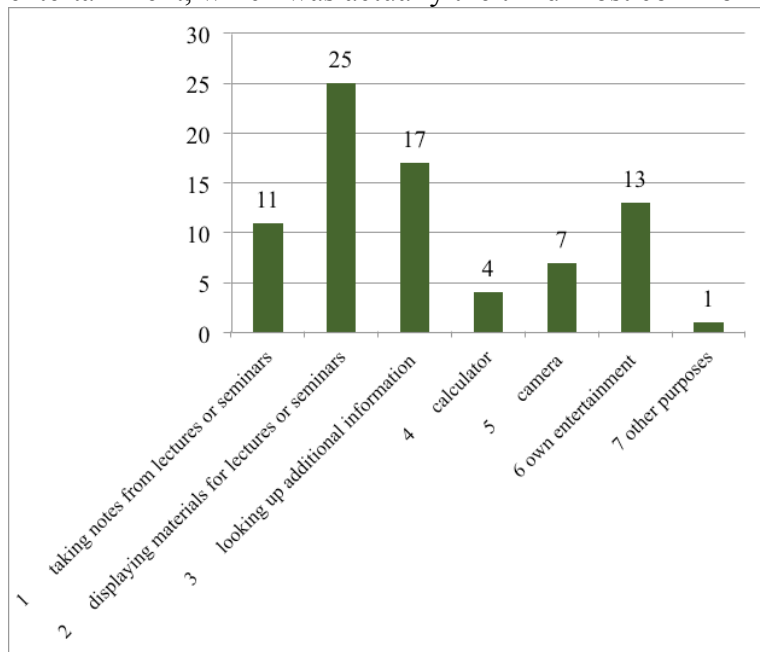


Figure 1. For what purposes do you use a tablet at school? (N=78 Women).

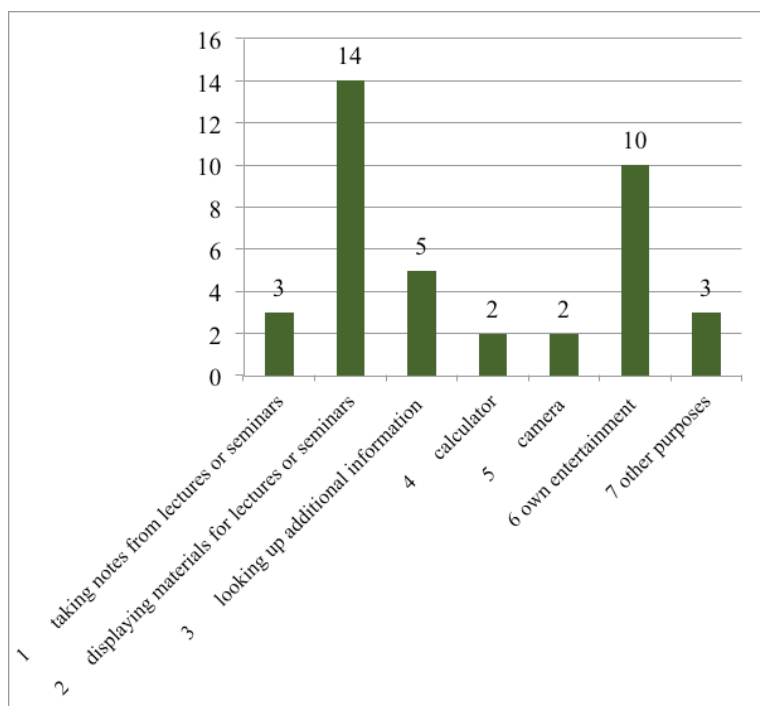


Figure 2. For what purposes do you use a tablet at school? (N=39 Men)



**Research Question No. 6**

In their answer to the sixth question in the questionnaire, i.e., whether the students would welcome the possibility to use tablets to a greater extent in studies on political economy. The majority of students were in favour of more extensive use (about 2/3 of respondents), both men and women alike.

However, an interesting difference between the genders is that more female students (34.21 %) than male students (23.81 %) were not in favour of using tablets more extensively in studies on political economy (see Table 6). This difference of almost ten percent may be explained by the concern of female students that the more extensive use of tablets would extend their range of study duties. According to the experience of the authors of the study in the field of education, women simply put more consideration into their subsequent decisions and are usually more cautious. This is also reflected in their more responsible way of preparing for exams and in the fact that they care more about the final results of exams.

Table 6

*Would You Welcome a Greater Use of Tablets in Classes?*

Answer	Women		Men	
	Number of students	In %	Number of students	In %
Yes	7	18.42	4	19.05
Rather yes	16	42.1	10	47.62
Rather no	13	34.21	5	23.81
No	2	5.27	2	9.52

**Analysis of the Hypothesis and Implications for Firms and Scientific Research**

**Verification of the Validity of the Proposed Hypothesis**

The obtained research results confirmed the validity of the given hypothesis that university students, both men and women, use tablets (as an example of smart technology) in their studies on political economy to an equal extent.

**Implications for Firms and Scientific Research**

- It is necessary to change the school's focus on traditional knowledge transfer methods to dealing with the problem of how information is processed and used. The rapid development of tablets allows their use in all areas of human activity.
- It holds true that graduates from both fields of study (OAE and OAA) use ICT a lot in their future work, whether it be in companies or government organizations. At this time, tablets can become a significant helper both in their practise at the workplace and in further education, whether it is formal or non-formal.

- Working with tablets already in their studies at university helps graduates to further orient themselves in ICT at specific workplaces in companies.
- According to university teachers, female IT students are more often above the average and very conscientious both in their studies and in project management.
- In the case of the respondents in the two main fields of study mentioned, men and women do not differ very much in their opinions and basic approach to owning and using tablets in studies.

### **Conclusion**

In the Czech Republic, the IT sector is an increasingly attractive field due to the significant increase in wages, among other things. For female students, choosing a field in IT has its specific upsides. If there are few women in the industry, they have less competition in the labour market.

If we summarize the results of the questionnaire survey on the use of tablets in studies on political economy at FEM CULS, it can be concluded that in the case of the respondents in the two main fields of study mentioned, men and women do not differ very much in their opinions and basic approach to owning and using tablets in studies. The differences in the responses on the issue of the affordability of tablets for students or their practical use is an exception. At universities, presently, large-display smartphones have become competition for tablets, allowing their substitution. Students stated the same thing in the discussion that teachers conducted on the results of the given survey, as a major reason why some of them do not buy tablets. They are interested mainly in merging both smart technology functions into one ICT device. On the other hand, they do not deny that the quality of work is greater for tablets in preparation for their studies.

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