

T_EX in Schools? Just Say Yes: The use of T_EX at the Faculty of Informatics, Masaryk University

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Abstract

Students at Masaryk University (MU) use T_EX for many purposes, such as writing theses, essays, and papers. It is also used by the staff for teaching electronic publishing and literate programming, for writing scientific papers, quizzes and teaching resources, and for generating documents and web pages from university databases by the university information system. T_EX and related technologies have been systematically supported and deployed at the Faculty of Informatics of MU (FI MU) for more than two decades. In this paper, we describe the T_EX-related support and projects that we have realized at various levels. These include the design of the Faculty's visual identity, resources for teaching electronic publishing, and for database publishing directly from the University's information system. We evaluate the outcomes, and consider some possible future deployments of T_EX-related technologies. With the data analytics of fithesis3 class support and its use at MU, we give arguments why the answer to the often-asked question in the title is in the affirmative, at least for computer science schools like ours and for authoring math publications.

Why not just hope that in the flow of getting words on a medium we play our humble role and hope we're not forgotten but remembered as inspiration. (Hans Hagen, [7, p. 32])

1 Introduction — basic premises

T_EX was born at a university, in the Stanford Computer Science Department, but primarily for one project of its author. Should it be used and taught widely in schools? Such questions have often been asked and answered [22, 4, 19]. Under which premises and for what purposes should T_EX and its friends be used in schools? The most appropriate answer is that it depends on the type of school, on the tasks, and on the end users:

- T_EX as a programming (macro) language? Probably not.
- T_EX as an example of a literate programming paradigm? Maybe.
- T_EX as a low level typesetting tool? In some cases, it depends on the type of school.
- T_EX in the L^AT_EX format as a reusable scientific authoring markup tool? Probably yes.



Figure 1: Hàn Thế Thành studied at FI MU in Brno from 1991 through 2001

- T_EX as a community building tool? No reason not to.

Working in academia for more than a quarter of a century, let us share our experience with T_EX in the context of the Institute of Computer Science and the FI MU in Brno. The rest of this paper should be understood in this light; the implications are specific to this type of school, place, time and other factors.

Historia magistra vitae (Latin proverb)

2 History of T_EX at Czech schools — just a predilection or an objective good?

Let us start with some historical remarks.

1980s T_EX found its way to Czechoslovakia at the end of the eighties, and was probably first used by the dissidents when preparing books and booklets that were forbidden to be printed officially [5]. For this reason, Czech diacritics had to be added to Computer Modern fonts [47].

1990s Within a year of the Velvet Revolution, the Czechoslovak T_EX Users Group (*C_STUG*) was founded. With the vast majority of the individual and institutional members of *C_STUG* being part of academia, high schools and universities became natural hubs of T_EX know-how.

To put this into a historical context — Hàn Thế Thành (Figure 1) came from socialist Vietnam and started to learn Czech at a Czech school and subsequently enrolled in the FI MU. The first Internet ADSL 56 kbps line from Linz in Austria was rented by the consortium of Czech universities to share. And at 290 kB, `latex.tex` was easy to both search and edit even on a PC XT with 640 kB of memory and two floppy diskettes.

As T_EX began to gain momentum, a group of enthusiasts decided to organize a T_EX conference in Prague [48]. Thus, EuroT_EX 92 was born with about 300 participants from all over the world. T_EX started to be used for book and database publishing [40].

A new Czechoslovak variant of the Computer Modern fonts (`csfonts`) was created. Math journals started switching to \TeX . *Czechoslovak Mathematical Journal*, *Applications of Mathematics*, and *Mathematica Bohemica* in Prague, *Archivum Mathematicum* in Brno, and *Mathematica Slovaca* in Bratislava all used \TeX as their primary typesetting tool.

Thus the community was already starting to grow. Groups of mathematicians started to typeset their reviews for the German *Zentralblatt Math* journal, and (\LaTeX) courses started to find their way into schools, primarily as *tools* for typesetting mathematics. One such a course was even taught at TUG 1993 in Aston, UK.

At that time, the first author was working at the Institute of Computer Science, Masaryk University, and promoted the use of \TeX there. There was a series of popular articles about \TeX published in a university bulletin *Zpravodaj MU* and in \mathcal{CS} TUG's bulletin *Zpravodaj \mathcal{CS}TUG*. MU became an institutional member of TUG. \TeX was actively supported and customized versions of \TeX supporting the Latin2 input encoding were created and compiled on shared \TeX installations within the university.

The first computer science faculty in the Czech Republic — the Faculty of Informatics, Masaryk University, Brno (FI MU) — was founded in 1994. Jiří Zlatuška, a proponent of \TeX , became its first dean. The faculty logo was designed by the first author as a *ligature* FI based on Escher's Penrose triangle, as seen in Figure 2. The motto of the logo comes from Blaise Pascal's *Pensées*: “The eternal silence of these infinite spaces terrifies me”.



Figure 2: The logo of the Faculty of Informatics: the ligature FI, as a symbol of quality typography, was implemented in METAFONT [49]. The optically scaled Computer Modern letters in the circular text were recursively joined using the ligature mechanism of METAFONT.

Rozvrh pro skupinu 1MI, 1994–95–léto

	6:50-7:35	7:40-8:25	8:30-9:15	9:20-10:05	10:15-11:00	11:05-11:50	12:00-12:45	12:50-13:35	13:45-14:30	14:35-15:20	15:30-16:15	16:20-17:05	17:10-17:55	18:00-18:45	18:50-19:35
Po	PS 186-4 Cv. teorie množin Hodnotil	PS 186-4 Cv. lineární algebra Slovák Jan	186-4 Slovák Jan	J 186 Angličtina šlágr Kat. jazyk			D 186 Sem. z funkcionálního prog. Hájek Pavel	186-n Sem. z funkcionálního prog. Skravada Libor			M 186 Lineární algebra Slovák Jan				
Út				A 186-4 Seminář z programování Sevečková Michaela	186-4 Seminář z programování Sevečková Michaela		A 186-4 Seminář z programování Sevečková Michaela			J 186-4 Angličtina pokl. Kat. jazyk		PS 186 Němčina Kat. jazyk			
St							J 186-4 Angličtina pokl. Kat. jazyk	186-4 Ada 186-m Teorie množin Kad'ourek Jiří				D 186 Návrh algoritmů I Ochránová Renata			
Čt															

Vážené záměry a opravy hlásek na studijní oddělení Ivt Holanovské

Figure 3: An example of a timetable for the 1MI study group at FI MU in 1994.

\TeX became the mainstay of everyday life at the Faculty. There was a need to typeset timetables, e.g. for lecture rooms, for individuals and for study groups. \TeX has proven itself to be an ideal tool for the job (see Figure 3). \TeX has been used for the typesetting of almost all database outputs of the Faculty administration [26], including phone directories, course catalogues — as seen in Figure 4 — and study diplomas.

A course on electronic document preparation opened in 1994. It was designed as a blend of both the theory and practice [18] of document preparation. The course teaches students about how information is transferred from the mind of an author via a markup language (\LaTeX) to the reader's mind. They are taught about the separation of form and content and about the particulars of both paper and digital output formats of PDF and (X)HTML. Since document development and program development have much in common, the students are taught to use versioning systems and automation tools such as `make`. As far as \TeX is concerned, the students learn both the practicalities, such as the typesetting of documents with an emphasis on theses, and the theory covering \TeX 's line-breaking and hyphenation algorithms.

Every effort was made to ensure the Faculty was a safe playground to experiment with \TeX toys and tools, for the benefit of all, and as part of the studies [27]. For students like Hàn Thé Thành, \TeX was the obvious choice for typesetting their essays and theses. Hàn Thé Thành picked \TeX and the recently designed PDF format as the topic of his Master's thesis. \TeX has been extensively used by the staff for their academic output and most research publications have been prepared in \TeX . The Faculty's technical report series has been designed in its own

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Doporučení: Je vhodné mít základy algoritmizace, základní znalosti práce s počítačem v unixovém prostředí (vhodné absolvovat například předmět P004 *UNIX*) a mít ponětí o formálních jazycích.

Úvod. Vymezení předmětu. Cyklus přípravy a ladění dokumentů. Analogie s vývojem programů. ✦ **Značkování.** Logická vs. vizuální struktura dokumentu. Značkovací jazyky, SGML, XML, HTML. Gramatiky dokumentů, DTD. Validace dokumentů, NSGMLS. ✦ **Design.** Principy knižního designu. Specifika designu na WWW. ✦ **Sazba.** Základy typografie, základní typografické pojmy, míry, terminologie. ✦ Písma, typy formáty písem, způsoby reprezentace a designu písem. Rastrovací algoritmy, techniky redukce tvaru písem. ✦ Pravidla sazby. Mikrotypografie. Specifika sazby českých textů. Korektura, značky. ✦ Sázeční systémy. \TeX jako příklad dávkového sázečního systému. WYSIWYG systémy. DSSSL, XSL. ✦ \TeX . Historie. Princip makrojazyka. Algoritmy řádkového a stránkového zlomu použité v \TeX u. *hz*-systém. Algoritmus dělení slov, ✦ **Předtisková příprava.** Jazyky pro popis stránek. Postscript. Bézierovy křivky. SPDL. Direct Imaging. Archivová montáž. ✦ **Tisk a distribuce.** Výstupní zařízení. Osvět, tisk a vazba. Portable Document Format, Adobe Acrobat. $\mathbb{E}\TeX$ 2html. pdf \TeX . Publikace databází. Konverze, aktualizace a údržba dokumentů. ✦ **Závěrečné shrnutí.** Sdílení zkušeností, anketa.

Doporučená literatura:

- Knuth, Donald Ervin. *Digital typography*. Stanford : Center for the Study of Language and Information, 1999. xv, 685 s.
- Beran, Vladimír. *Typografický manuál : učebnice počítačové typografie*. 1. vyd. Náchod : MANUÁL, 1994. přeruš. st.
- Bringhurst, Robert. *The elements of typographic style*. Vancouver : Hartley & Marks, 1992. 254 s.

Figure 4: The syllabus of the Electronic publishing course typeset in Minion by `pdftex` as a part of the Yellow book of courses taught at FI MU in 2004.

$\mathbb{E}\TeX$ style with Hermann Zapf's Palatino as the faculty's primary font.

To automate the typesetting of longer texts and database publishing, quality hyphenation was required. The results of the first author's research [45, 32] were reported at TUG 1995 (and elsewhere), where the first author met Donald Knuth and took the photo in Figure 5. Don was subsequently invited to Brno to receive his twentieth honorary doctorate.

When he arrived in Brno, Don saw his Computer Modern fonts on the timetables of public transport tram stops (see Figure 7). He was delighted to see the fruits of his 'labour of love' being used on the other side of the globe, both in theory and in practice. He mentioned this in his inaugural speech (Figure 6) when he became the first recipient of an honorary doctorate from FI MU.

In 1996, Hàn Thê Thành defended his masters thesis [10]; the program called `tex2pdf` [31] was presented to the \TeX community at the TUG 1996 conference in Dubna, Russia. The program caught the eye of the \TeX community and was subsequently renamed `pdftex` and its manual was drafted [15].

The new toy needed users willing to test it in day-to-day \TeX authoring work. We maintained faculty-wide installations for multiple operating systems that shared the same `texmf` trees; in addition,



Figure 5: Donald Knuth's finger raised when talking to Jiří Zlatuška at the TUG 1995 conference in Florida; photo taken by Petr Sojka.

we kept historical \TeX Live installations and made them available via a module switching mechanism. Twenty years later, most \TeX Live versions of the past are still installed and ready to use; this makes it easy for authors to go back in time and retypeset decades-old material. Lowering the bar for starting with \TeX , by having the tools ready to use and a local community ready to help, made \TeX the go-to



Figure 6: Donald Knuth’s talk at the Faculty of Informatics, Masaryk University, Brno, 1996

<p>▼ Kohoutovice</p> <p>1 Pavlovská</p> <p>2 Tělichova (o)</p> <p>3 Běllova</p> <p>4 Voříškova</p> <p>5 Staničova</p> <p>6 Glínkova</p> <p>7 Borodínova (o)</p> <p>8 Libušina třída (o)</p> <p>9 Libušino údolí (z)</p> <p>10 Antonína Procházky (z)</p> <p>12 Pískový</p> <p>15 Výstaviště (o)</p> <p>17 Mendlovo náměstí</p> <p>19 Tvrďého (o)</p> <p>21 Úvoz</p> <p>23 Komenského náměstí</p> <p>z : zastávka celodenně na znamení o : zastávka od 20 do 5 hodin na znamení</p>	<p>137</p> <p>Odjezdy ze zastávky Kohoutovice</p> <p>PRACOVNÍ DNY</p> <p>0 30M</p> <p>1 30M</p> <p>2 30M</p> <p>3 30T</p> <p>4 00 15 30 42 51</p> <p>5 05 11 16 22 27 33 38 44 49 55</p> <p>6 00 06 11 17 22 28 33 39 44 50 55</p> <p>7 01 06 12 17 23 28 33 40 46 54</p> <p>8 02 08 14 20 26 32 38 44 50</p> <p>9 02 14 26 38 50</p> <p>10 02 14 26 38 50</p> <p>11 02 14 26 38 50</p> <p>12 02 14 26 38 50</p> <p>13 02 14 26 38 50</p> <p>14 02 08 14 20 26 32 38 44 50 56</p> <p>15 02 07 13 18 24 29 35 40 46 51 57</p> <p>16 02 09 15 22 28 35 42 43T 49 57</p> <p>17 05 06T 13 21 24T 30 37 45 54</p> <p>18 03 12 14T 21 31 40 49</p> <p>19 00 12 23 33 45 51T 58</p> <p>20 10 13T 22 34 46 58</p> <p>21 10 22 34 47 57T</p> <p>22 02 10T 22 42</p> <p>23 09T 13M 30M 51T</p>	<p>linka: 137</p> <p>kód stopu: 117</p> <p>datum: 12.3.1996</p> <p>strana: 1</p>
<p>SOBOTA</p> <p>0 30M</p> <p>1 30M</p> <p>2 30M</p> <p>3 30T</p> <p>4 00 15 30 45</p> <p>5 00 15 28 41 54</p> <p>6 06 18 30 42 54</p> <p>7 06 18 30 40 50</p> <p>8 00 08 16 24 32 40 48 56</p> <p>9 04 12 20 28 36 44 52</p> <p>10 00 10 20 30 40 50</p> <p>11 00 10 20 36 44 52</p> <p>12 00 08T 10 20 31 43 54</p> <p>13 06 08T 17 29 40 52</p> <p>14 03 15 26 38 49</p> <p>15 01 12 23 34 45 56</p> <p>16 06 16 26 36 46 56</p> <p>17 07 18 29 40 51</p> <p>18 02 13 24 35 46 58</p> <p>19 11 23 25T 36 50</p> <p>20 04 11T 17 30 43 57</p> <p>21 10 24 37 51</p> <p>22 04 14 24 43 48T</p> <p>23 06M 08T 30M 49T</p>	<p>NEDELE</p> <p>0 30M</p> <p>1 30M</p> <p>2 30M</p> <p>3 30T</p> <p>4 00 15 30 50</p> <p>5 05 20 35 50</p> <p>6 05 25 50</p> <p>7 05 20 35 48</p> <p>8 03 15 27 39 51</p> <p>9 03 15 27 39 51</p> <p>10 03 15 27 39 51</p> <p>11 05 19 31 40 52</p> <p>12 04 16 28 40 52</p> <p>13 04 16 28 39 50</p> <p>14 01 12 23 34 45 59</p> <p>15 13 22 28 36 45 53</p> <p>16 02 11 21 30 39 48 57</p> <p>17 05 11T 23 31 38 45 51 57</p> <p>18 03 09 15 23 31 39 47 55</p> <p>19 03 13 23 27T 36 37T 50 51T</p> <p>20 04 11T 17 30 43 57</p> <p>21 10 24 37 51</p> <p>22 04 14 24 43 48T</p> <p>23 06M 08T 30M 50T</p>	
<p>M : jede jen na Mendlovo náměstí T : jede do Husovic na Tomkovo náměstí</p> <p>DPmB, Hlinky 151, tel. 4217 1111 Informace o MHD, tel. 4281 0554</p> <p>Platí od 1.prosince 1995</p>		

Figure 7: Brno public transport timetables featuring Computer Modern fonts during Knuth’s visit to Brno in March 1996.

system for authoring long documents such as books or theses. The fithesis L^AT_EX class for typesetting

theses was designed, installed and offered to the students. They were given a small booklet “Getting started with T_EX at FI” on enrollment day at the Faculty.

There were conferences being organized by the Faculty, e.g. Gödel in 1996, and a multiconference on the Mathematical Foundations of Computer Science (MFCS) in 1998. T_EX was used for typesetting all conference materials from a single *textual* database; Figure 9 shows one example of this material. In the Seminar on Linux and T_EX (SLT) organized mainly by the students themselves, Linux and T_EX enthusiasts developed not only an interesting research program, but also the icons seen in Figures 8 and 10 drawn by Petra Rychlá.

The information system of the Faculty, also developed partly by the students [26], generated most of its output via a secure independent sandboxed T_EX installation. Data for the course catalogue were acquired from the teachers using web forms, then validated, converted to L^AT_EX, and typeset. The DTD for the validation of the submitted data enabled the use of special entities &T_EX; and &L_AT_EX; ©. Hyphenation pattern were further improved [33] to minimize errors in automated workflows. Students were motivated to actively participate in T_EX-related projects. Mirka Misáková implemented Gutenberg-like justification in METAFONT as a part of her thesis [21], Jan Pazdziora studied line and page breaking algorithms [25], and Pavel Janík studied digital font formats [16]. Most of $\mathcal{N}\mathcal{T}\mathcal{S}$ [50] was programmed in Brno by the MU alumnus, Karel Skoupý [30].

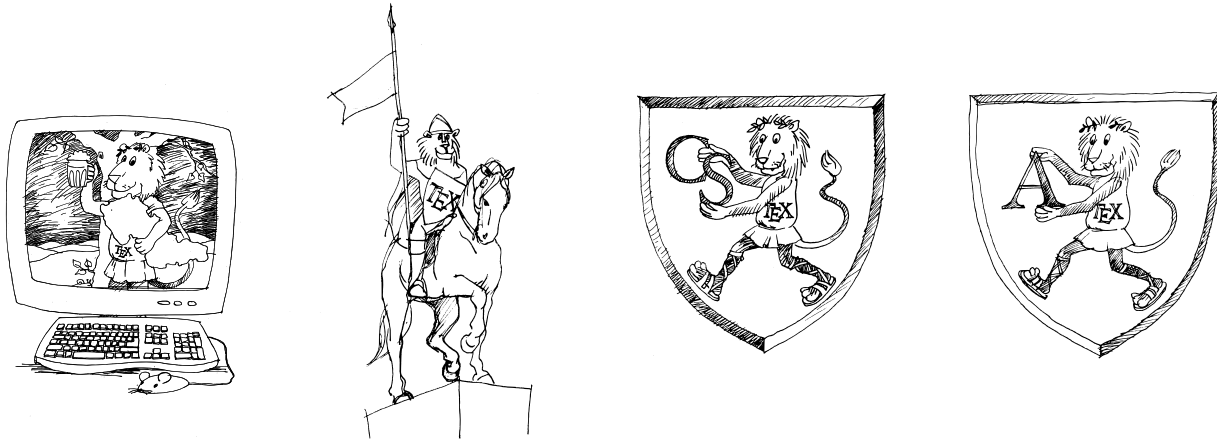


Figure 8: Icons for the Seminar on Linux and \TeX (SLT '98), drawn by Petra Rychlá.



*MFCS/CSL'98 Conference
Welcome Party Invitation
for Mr. Honza Staudek*

*You are wholeheartedly invited to the welcome party
of the MFCS/CSL'98 Conference.*

*The welcome party will take place in the open space
inside the building complex of Faculty of Informatics,
Botanická 68a, at 7:30 PM on Sunday, August 23,
1998. Starobrno beer will be served.*

Please, present this invitation card at the entrance.

Figure 9: A personalized invitation card typeset for the participants of the MFCS '98 conference held at FI MU.

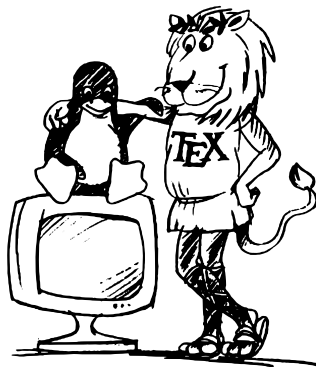


Figure 10: The logo of the Seminar on Linux and \TeX (SLT), drawn by Petra Rychlá.

2000s Hàn Thế Thành consulted on further `pdftex` improvements [11] with Herman Zapf, and conducted several microtypographic experiments together with Hans Hagen who came to give a special course on Typographic Programming in Brno. In October 2000, Hàn Thế Thành finished his dissertation [12], and

left Brno after 11 years of study. He returned to Vietnam, secured his family financially and for a short while worked in Vietnamese academia [13, 14].

As the power of electronic documents and demand for them was increasing, new coursebooks and interactive teaching materials were created [6]. There was demand for animations in PDF [34], for the automation of multiple choice testing [36], and for interactive teaching materials in PDF and JavaScript [35]. \TeX 's notation was so common for the University math teachers that they demanded an extension of the interface for creating online quizzes that would enable them to directly input \LaTeX formulae using a special `$` and `$` element. Math formulae were rendered on the fly via a pipe of \LaTeX to `dvipng`. The software for the automated scanning and evaluation of test sheets generated by \TeX [9], an extended version of `patgen` called `opatgen` that enabled the direct use of UTF-8 patterns [2, 1, 39], and the software for producing animated PDFs in `pdftex` [8] may serve as examples of other \TeX -related tools that have been designed and developed by students and staff at FI. The reuse of textbook content authored in \TeX for multiple output devices was also requested. We have been able to show that, given that form and content are separated in the markup, several different outputs can be easily generated via \TeX , namely PDFs suitable for printing, PDFs suitable for reading on a screen, HTML for web-enabled devices, and XHTML/MathML for fully standards-compliant web-enabled devices [42] without the monstrous systems of large publishers. Our \TeX -based production system is used by most of journals delivering to the DML-CZ library [29, 43].

At the time when \TeX and Knuth became widely known, many software businesses started to move to Brno, which is now known as the Silicon Valley

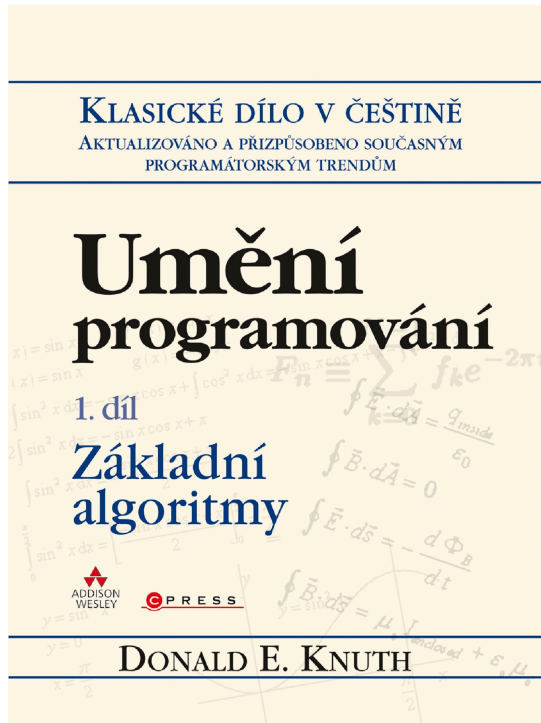


Figure 11: The Czech translation of TAOCP, Vol. 1, published by Computer Press in 2008.

of Central Europe. Consequently, a publisher based in Brno had the Art of Computer Programming (TAOCP) translated into Czech (by a FI MU alumnus) and retypeset from Knuth’s sources (Figure 11).

2010s Leveraging their \TeX typesetting know-how, the students and alumni of FI MU joined several projects related to digital mathematical libraries, namely DML-CZ and EuDML. A \TeX -based workflow for journal publishing has been developed with an automated export of an archival version that would be stored in the digital library. The *Archivum Mathematicum* journal published by MU uses the tools and the workflow developed for DML-CZ [44, 38]. Several related tools have been developed: an efficient PDF recompression technique [41] and the \TeX math indexing and searching algorithm from the MIaS project [20] deployed in EuDML [46]. As blind students needed to study math from \TeX -authored textbooks, support for Czech Braille output has been prepared as part of a master thesis [17].

The creation of \TeX -related software has been supported by the dean’s research project program and offered as a topic for theses. The second author of this paper, supervised by the first author, created a new version of the *fithesis* class [23] with fine-tuned support for all nine faculties of Masaryk University. Thousands of students across the university now au-

thor their theses in \LaTeX with the ability to discuss problems via a dedicated forum in the university information system. Students have also started to file pull requests to customize style options of other faculties, a sign of a growing faculty-local \TeX support community.

Another development was triggered by the inability of *markdown* to prevent the occurrence of Czech vowelless prepositions at the end of lines in FI MU senate minutes, which is a grave error according to Czech typography rules. The new *markdown.tex* macro package that enables the processing of *markdown* documents directly in \TeX solves this issue as a tiny side-effect [24].

The fruits of separating form and content were recently reaped when Masaryk University changed the visual style for their documents. Changes in the \TeX -based workflow were minimal and did not affect the authors much — a *muletter* style file for preparing letters, and a thesis review document template were put on the Faculty’s GitLab server shortly after the new visual style was released and smoothed the transition significantly.

The use of \TeX at MU currently celebrates a quarter century of support and development, where students and staff have contributed significantly both to the questions and solutions in the digital typography world and especially within the 40-year-old \TeX family.

So, maybe instead of ambitious themes, the only theme that matters is: show what you did and how you did it. (Hans Hagen, [7, p. 32])

3 Where we are now and what’s next — predictions

Nelson Beebe predicted the future of \TeX more than a decade ago [3]. The world we live in constantly changes, and while most predictions still hold, some have to be revisited. We have tried to evaluate the influence of the \TeX tools and predilections using statistical data about theses defended not only at FI MU, but across the entire university.

With the creation of the *fithesis3* \LaTeX class, the level of support for thesis writing entered a new era [23]. Templates in *fithesis3* were prepared for each of the nine faculties of Masaryk University. Writing a thesis is now just a few clicks away even if the author does not have a working local \TeX installation. Enchanted by the ease of the authoring process and the beauty of the resulting documents, it seems likely that many will install \TeX on their devices at some stage. Cloud \TeX environments enable much faster learning by example than before, and allow for

online consulting, commenting by supervisors, and collaborative debugging.

The portability, stability, reliability, and style uniformity enforced implicitly by visible markup, the ease of writing math, as well as the aesthetic and visual qualities of the output are the main benefits compared to WYSIWYG editor alternatives. This is attractive for students, as can be seen in Figure 12.

In parallel, a beamer theme `fibeamer` has been developed and made available in \TeX Live and cloud \TeX platforms to allow the students to prepare their presentations for thesis defense without having to bother about the visual style of their slides. This appears to be especially attractive for the students of the Faculty of Arts — see Figure 13.

Approximately 40,000 students study at Masaryk University and all theses defended are archived in the university information system. We have used heuristics to detect whether a thesis has been written in \TeX on a sample of 44,875 theses submitted at MU from 2010 through 2015. It is estimated that the number of theses written in \TeX across the entire University steadily increased from 5.67% in 2010 to 6.28% in 2014. Extrapolating this trend indicates that 100% of theses will be written in \TeX by 2783 ☺.

Theses written using \TeX had been awarded grade A statistically significantly more often and grades C and D statistically significantly less often than theses not written using \TeX [23]. The awarded grades are summarized in Table 1 and in Figure 14. There is clear evidence that theses written in \TeX received better grades than theses written using different tools. It remains to be shown that the grades students received for theses written in \TeX are consistently better than the grades the students received for their state exams — the hypothesis is that using \TeX helped the students reach grades that do not correspond to their ability to study in general.

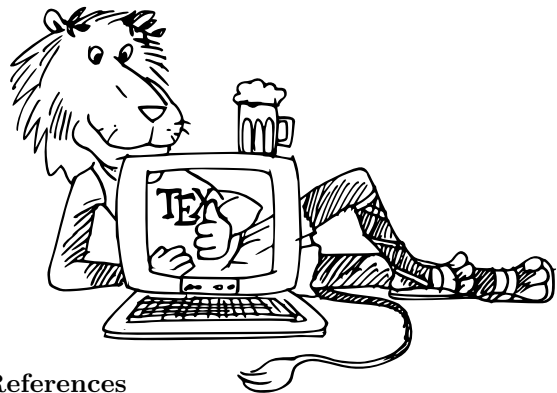
To conclude, the main lessons learned from \TeX at MU are:

- Sustainable support for [thesis] writing in \TeX and incentives for community building by university are very important. There should ideally be a playground where students and faculty members can play and experiment together, work on joint projects, and have fun.
- Using \TeX in the daily agenda of the university is motivating, and is a win-win situation for both students and faculty members — the students learn new things while the faculty administration and teaching is effective and enjoyable.
- The \TeX typesetting kernel gives visually appealing results, often superior when compared

to other alternatives, especially when math typesetting is needed, as in STEM education.

- Contrary to most WYSIWYG alternatives, the use of \TeX gives consistent results, is productive and efficient for database and automated publishing, and for long documents containing math. It is a safe choice, especially when there is official support.
- The separation of form and content and \TeX as a fixed point in document authoring is another benefit academics recognize in their ever-changing world: it allows reusing content in different portable forms and formats that appear over time.
- The usage of \TeX as a typesetting kernel in a university information system has paid off in decades of use.

Young, smart students who enjoy playing with \TeX document tools are constantly appearing, joining the community, and taking on ambitious new \TeX -related projects and challenges. This allows the retiring faculty members to take a well-earned rest.



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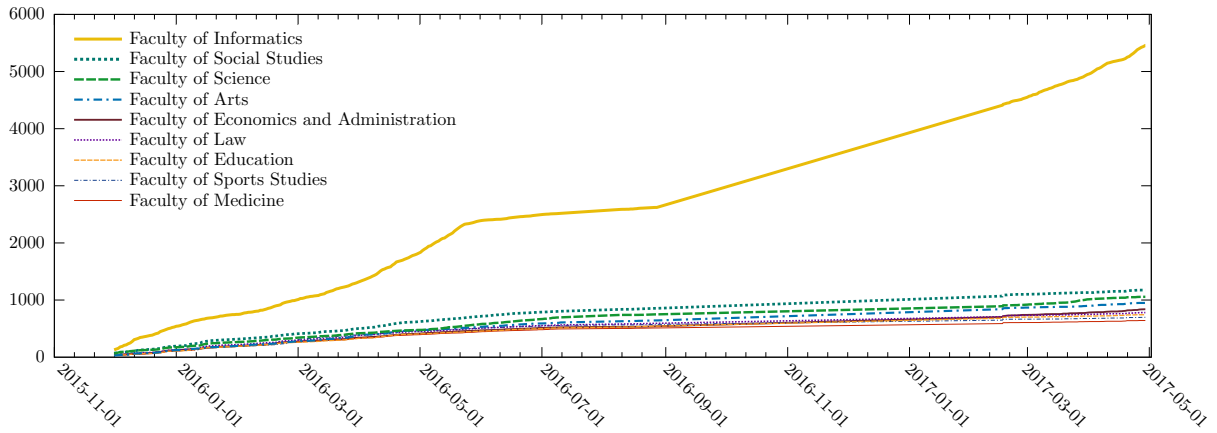


Figure 12: The cumulative number of views of the `fithesis3` document class in the online service of Overleaf.

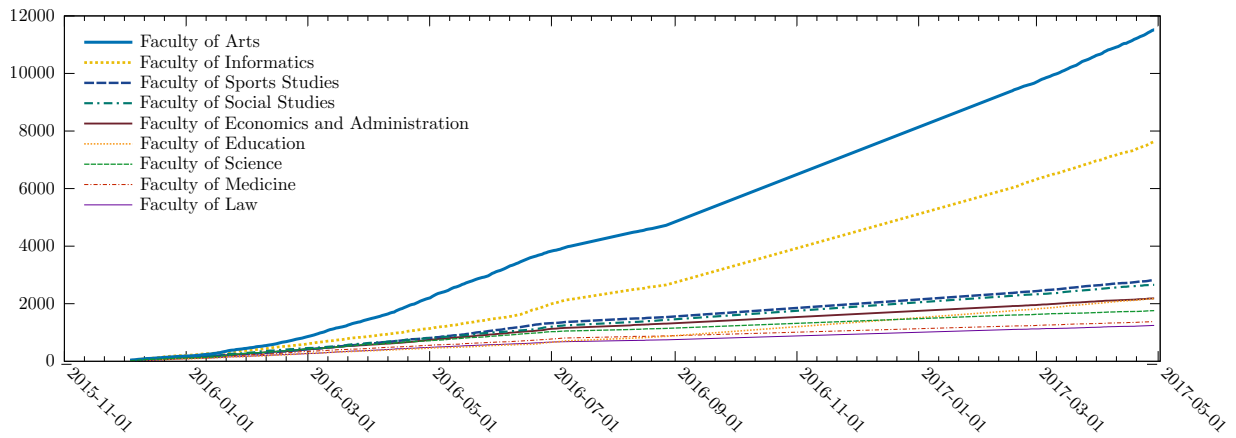


Figure 13: The cumulative number of views of the `fibeamer` beamer theme in the online service of Overleaf.

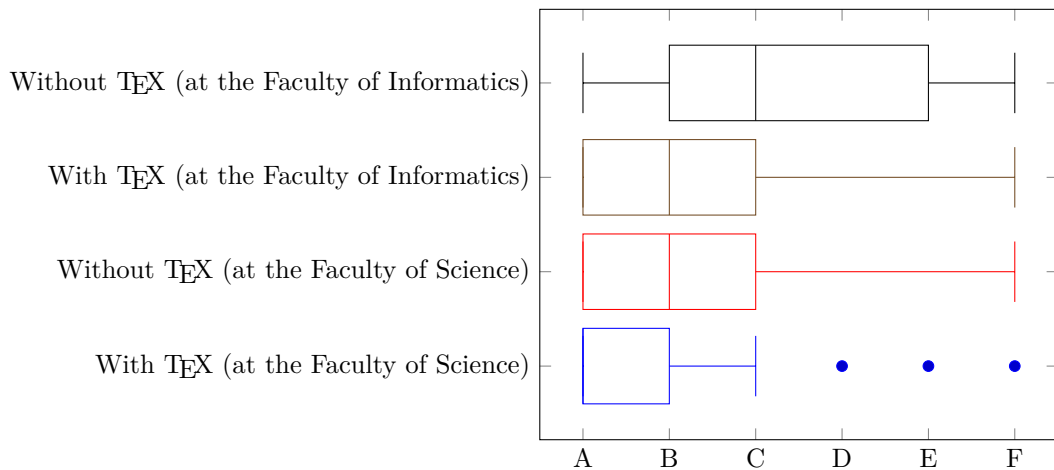


Figure 14: A box plot of the grades of theses written and defended during 2010–2015 at the Faculty of Informatics (FI MU), the Faculty of Science (Sci MU).

Table 1: The contingency table of the numbers of marks awarded to theses written and defended during 2010–2015 with Pearson’s goodness-of-fit measure $(E - O)^2/E$ between the expected (E) and the observed (O) numbers of marks awarded to theses written using \TeX .

Grade	Without \TeX	E(with \TeX)	O(with \TeX)	$(E - O)^2/E$
A	15,476	988	1,181	37.858
B	9,999	638	587	4.093
C	7,926	506	381	30.799
D	4,020	257	194	15.248
E	2,783	178	128	13.853
F	1,979	126	145	2.771
Total	42,183	2,692	2,692	104.623

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