



Reducing Error Rate in Property Tax Declaration Forms through Simplification and Highlighting Instructions

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Abstract:

The paper is mixed-method research on reducing administrative burden and, more specifically, the learning costs of filling out a property tax declaration form. It presents the development process of a guidebook, which simplified the instructions and experimentally tested the effectiveness of the guidebook in lowering the error rate. Young Slovak adults (N=43) were divided into two groups; the treatment group worked with the guidebook, and the control group used the official instructions the Ministry of Finance provided. The guidebook aimed to decrease learning costs using behavioural support (simplification, highlighting, examples, and the like). The results suggest that the guidebook helps significantly decrease the number of errors compared to the complex instructions the Ministry of Finance provided. However, while the guidebook is very effective in reducing errors in simple tasks, it may not be sufficient help for more complex tasks such as mathematical calculations. Therefore, simplified instructions must go hand-in-hand with interventions such as pre-populating of forms.

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Keywords:

guidebook, laboratory experiment, property tax, salience, simplification

1. Introduction

There are things that we do only a few times in our lives; therefore, we have little or no experience with these activities and only limited space to improve. Filling out a property tax declaration is one of many such examples. The task is procedurally complex and cognitively demanding and requires a lot of patience and relatively decent mathematical skills. These elements can be insurmountable barriers, so it is not surprising that most people must visit the tax office and rely on the expertise of civil servants. This results in inefficiency not only through wasted time and resources but also because of the negative experience of citizens when interacting with the state.

Taxation costs are incurred by the local tax authority (administrative costs of taxation) and on individuals (private costs of taxation). Administrative taxation costs are the costs of the public sector operating a tax agenda, whereas private taxation costs relate to complying with requirements of a tax (Nemec et al., 2017). The property tax declaration form is full of pitfalls and barriers that can be very difficult for an individual to overcome. Therefore, the individual compliance taxation costs consist of time and interest loss, mental costs, and financial costs (payment of tax). Moynihan et al. (2014) propose a concept of administrative burden. Residents often face an administrative burden comprising learning, psychological, and compliance costs. In this paper, we use the concept of administrative burden with a focus on the learning costs of individuals. In addition, we utilise two behavioural insights, simplification, and highlighting key information, i.e. salience (BIT, 2015), which can reduce the administrative burden imposed on citizens. Simplified instructions and drawing attention to important information or procedures affect learning costs. Reduced learning costs should make it easier for the individual to understand and follow instructions and thus make fewer errors.

In this paper, we describe the process of designing the guidebook, which aims to reduce the citizens' learning costs (understanding instructions) and help them fill out the tax declaration form, which we test experimentally. The guidebook is an upgraded version of the instructions designed by the Ministry of Finance of the Slovak Republic (hereafter only as the MoF). Simplifying instructions and the emphasis (salience) of important procedures and information is expected to reduce learning costs that should improve understanding of the instructions and thus lower the error rate. Furthermore, learning and psychological costs are difficult to separate and likely to correlate (Halling & Bækgaard, 2022). Learning costs can be associated with psychological costs in the form of stress, stigma or loss of autonomy (Bækgaard & Tankink, 2021). Therefore, reducing learning costs may positively impact user experience.

The paper aims to experimentally test the guidebook as a tool that can help and navigate citizens through paperwork. We use the error rate as a proxy for learning costs. We assume that if learning costs are reduced, individuals can provide more accurate input in the property tax form. Since the guidebook was designed to reduce the learning costs of citizens, the research question is as follows: *Is a guidebook that simplifies instructions and highlights important steps an effective tool in reducing error rate? Furthermore, if so, what is the effect size?* In this sense, we focus on the user experience with the guidebook. To increase the added value of this study, we describe the process of developing and designing the guidebook.

This paper presents mixed-method research, and we use both qualitative (sprint design, interviews) and quantitative (form grading) data collection and analysis (text analysis of existing documents, t-tests, and linear regression) methods to answer the research question. In both phases of the guidebook development (interviews) and effectiveness testing (laboratory experiment), we recruited young Slovak adults who are likely to submit the property tax declaration in the future and are more likely to use an online guidebook than more older adults. The study subjects were recruited from graduate students from the Faculty of Social and Economic Sciences at Comenius University in Bratislava. We can assume that this sample may have better digital skills (working with computers and digital documents) than the general public. However, we expect that younger users will more likely use the online guidebook because they are confident working with computers and digital documents.

We contribute to the literature on administrative burden by examining the effects of simplification and highlighting instructions on reduction of learning costs and by pointing out the limits of this approach in cognitively demanding tasks. Moreover, we investigate the experiences of individuals when they cope with administrative burdens and provide a perspective from a Central Eastern European country that might be different from Western countries in terms of public service motivation and capacity to cope with administrative burdens.

The structure of the paper is as follows: First, we outline the theoretical background of administrative burden and learning costs. Second, the research methodology, the guidebook's development, and the study's context are described. Third, the results, discussion, and points for practitioners follow.

2. Administrative burden and ways to reduce learning costs

Burden et al. (2012) define the administrative burden as an individual's experience of policy implementation as onerous. While these authors frame administrative burden as an individual's experience, other researchers focus more on state actions (policies, rules) rather than individual experience (Moynihan & Herd, 2010; Fox et al., 2020; Sunstein, 2022). The administrative burden literature is a relatively young research field with

inconsistent use of critical concepts (Bækgaard & Tankink, 2021). Bækgaard and Tankink (2021) suggest that we need to distinguish between 'state actions' (laws, regulations, and their implementation) and 'experiences of administrative burden' (experiences of individuals). Using this conceptualisation, we focus on the latter in this paper.

Halling and Bækgaard (2022) identify seven causal relationships that have been investigated in the administrative burden literature. Most scholars investigated the relationship between barriers and costs, distributional consequences of barriers, other factors (e.g. frontline workers) and experiences of burden, and factors influencing burden tolerance and barriers. In this paper, we focus on the relationship between barriers and costs. Barriers increase the costs that individuals need to overcome, apply, or comply with the rule. Moynihan et al. (2014) argue that the administrative burden faced by residents consists of learning (acquiring and understanding information), psychological (emotional experience), and compliance costs (fees, waiting times). The administrative burden is present in the situation where individuals apply for a government programme, fill out forms, visit the authorities, collect information and documents, pay fees, and the like. The administrative burden is a kind of tax that could be translated into money, such as an extra hour of paperwork, travel, or reading, which has its opportunity costs in financial resources. Herd and Moynihan (2022) point out that citizens often need specialist help offered by third parties with the knowledge to manage burdens (e.g. tax accountants), and such a cost is itself a burden. Bækgaard and Tankink (2021) stress that learning costs are interconnected with psychological and compliance costs. The experience of administrative burden is relevant in citizens' communication with public administration. Different people have different reactions to the level of burden. Poor, less educated, older, or sick people are less able to overcome the burden, and for them, it is a 'curse' (Sunstein, 2022). Not all of us, and at any time, have the mental capacity (bandwidth) to cope with the burden (Mullainathan & Shafir, 2013).

Various forms of administrative burden can be found in application forms for programmes, subsidies, or allowances, and they impact who will apply and whether they meet the deadline. For example, the way of presentation and registration process of the various social programmes can significantly influence the behaviour of applicants (Bertrand et al., 2004). Other research found that proactive and comprehensible communication can significantly reduce the burden and increase users' incentive to switch from paper to digital forms, especially those whose compliance costs are potentially higher due to commuting (Bhanot, 2021). The administrative burden could be reduced by the so-called 'pushing', which can take the form of setting smart default options (Fishbane et al., 2020). The administrative burden creates friction. Behavioural science shows that friction matters because people value friction more than classical economic models suggest (Herd & Moynihan, 2022).

In this study, we focus on the concept of learning costs as a component of administrative burden. Learning costs imply the lack of information on eligibility for

programmes and administrative duties, a higher amount of information needed, or higher cognitive requirements related to certain administrative procedures (Moynihan et al., 2014). Learning costs are caused, for example, by formalised communication in job advertisements, which discourages participation or application, even if the applicant meets the formal requirements (Sievert et al., 2020). Delays in health care are also associated with a number of administrative tasks and requirements that patients need to fulfil (Kyle & Frakt, 2021). The application forms (education, social programmes, and the like) are associated with learning costs that can make it harder for eligible people to register or enrol. In the context of property tax declaration, learning costs can be associated with studying instructions and the property tax form and finding the required information in the certificate of ownership.

There are several examples of a reduction of learning costs using two main strategies: simplification and guiding. Regarding the first listed strategy, several control trials showed how simplified administrative procedures and more intuitively designed instructions and forms could reduce learning and compliance costs (BIT, 2015). The number of successful applicants for social subsidies increased when the application procedures were simplified (Hanratty, 2006; Ratcliffe et al., 2007). The reduction in cognitive requirements in the application process in the US health system allowed a significant number of citizens to apply for Medicaid (Fox et al., 2020). The simplification and reduction of text distributed to households about taxation have efficiently reduced the learning costs, resulting in higher payment rates (Bhargava & Manoli, 2015). Highlighting key information in official communication can increase the number of visits to the benefit enrolment website (Hyman, 2019). Simplifying communication by making it easy to understand the substance of the communication (e.g. a letter) can reduce learning costs and remove friction that may otherwise lead to inaction (Linós et al., 2022). Simplification that aims to improve the understanding of instructions or categories in forms can significantly reduce the administrative burden. Moynihan et al. (2022) show that people lack an intuitive understanding of state categories (such as the self-employed category), and a more intuitive presentation of information about the categories and benefits in the application forms can improve the rate of filling in forms accurately (matching the favourable category). They illustrated that the state could try to simplify its formal categories to be more consistent with the public understanding of associated terms (Moynihan et al., 2022).

In addition, the guiding (an assistance) can reduce the learning costs of an applicant. The natural field experiment found that applicants who received personalised instructions had a higher success rate and acceptance rate (Bettinger et al., 2012). Elsewhere, the provision of personal assistance in completing applications and automatic registration in programmes have increased the success of the target group to apply for services in education (Bettinger et al., 2012) or health (Herd et al., 2013). However, it may be questionable as to what level of detail in the instructions is still beneficial and what level of detail may no longer help to reduce the burden. Hock et al. (2021) showed that more detailed information about a programme could increase the

enrolment rate more than urgent message framing, which suggests that providing a little more information, either an instruction or an explanation of a formal category (Moynihan et al., 2022), might reduce the administrative burden and errors of individuals in forms.

3. Study design and methodology

The methodology has three parts. In the first part, we describe the background of the property tax declaration form in Slovakia. The second part describes qualitative and quantitative data collection methods and the procedures for developing a guidebook and a qualitative method used in pre-testing this guidebook. Finally, the third part explains the laboratory experiment's operationalisation, materials and procedures.

3.1 The case of property tax declaration in the Slovak Republic

The property tax declaration form is unified in the Slovak Republic, and the MoF develops the form, and local government units cannot change or amend it. However, the administration of the process and tax collection is the competence of local government units (Sedmihradská, 2013). The average annual revenue from property tax paid by natural persons for a flat / house and non-residential space (e.g. parking, cellar) is about € 8.3 million, approximately 2% of all revenues of the capital city, Bratislava (Final account of the city of Bratislava, 2022). The Department of Local Taxes, Fees and Licences of Bratislava calculates the tax due by multiplying the floor space of a flat or house and non-residential space (e.g. parking, cellar) by the property tax rate (districts closer to the city centre have a higher tax rate). The value of the property is not included in the tax calculation.

Each year, approximately 20 thousand residents are obligated to submit the property tax declaration form in Bratislava. Only a tiny fraction of them can complete and submit the form without assistance from the Department of Local Taxes, Fees and Licences. The reason is that the form requires not only information about the individual but also about the floor space of the property and the size of the land. The form is complex, and its procedure and categories could be more intuitive. Moreover, most residents fill this document only once or a few times during their life. It is predominantly new property owners and those who have sold real-estate property who are obligated to submit the property tax declaration. Since the local government unit cannot change or amend the form, a guidebook is one of the few options for how local administration may help citizens cope with the property tax declaration.

3.2 Developing a guidebook

The guidebook was developed in cooperation with Department of Local Taxes, Fees and Licences of Bratislava, Slovakia. The whole development process was spread over three months and was completed in mid-November of 2021. The estimated costs for developing, designing, and implementing the guidebook on the part of the Department are € 2,700. It consists of three man-days of three tax administrators (gross hourly rate € 25), 10 hours of consultations in the designing and piloting phase (gross hourly rate € 25), and 20 hours of developer and designer work (gross hourly rate € 35).

The process of developing the guidebook had three phases. First, we analysed the entire process of filling out, handing out, evaluating, and processing the property tax declaration and the existing documents. We organised three full-day workshops with three tax administrators. Through a series of design-sprint-like activities (Knapp et al., 2016), we aimed to identify qualitative insights that would help us structure and write the guidebook, including:

- defining personas (characteristics) of taxpayers,
- description of a property tax ‘life cycle’ from the perspective of both the Department of Local Taxes, Fees, and Licences and a taxpayer,
- identifying the five most common use cases of real estate ownership (type of properties),
- description of the most common errors in property tax declaration made by taxpayers.

Based on the workshop, we created a step-by-step map for filling out the property tax declaration, which became the first version of the guidebook. The guidebook aimed to simplify the instructions by making them easy to understand, using far less text and more graphical design features that drew attention to specific procedures and explained the fields to users.

In the second phase, we verified this version with tax administrators. In total, three rounds of feedback were held. Most attention was paid to the sections where taxpayers are asked to calculate the floor space (in square metres) of the property and land area, which is the most problematic part of the tax declaration. Based on repeated feedback from the tax administrators, we iteratively optimised the guidebook in its final form.

The third phase was pre-testing the guidebook. This phase consisted of six qualitative interviews. The subjects were asked to fill out the tax declaration with the help of the guidebook. We asked them to think aloud and elaborate on their decision-making process, emotions, and ideas as they filled out the tax declaration with the help of the guidebook in printed or electronic versions. Two researchers were present during the interviews, one moderated the session, and the other monitored the entire process and made notes in the Miro software. The interviews lasted approximately 90 minutes and were not recorded. The completed tax declarations were evaluated and stored. Based on the findings, we adjusted and modified the guidebook into a final version.

3.3 Materials and procedures

To answer the research questions, we conducted a laboratory experiment to test the effectiveness of the guidebook (treatment) against the pre-existing, publicly available instructions (Instructions for Completing the Local Tax Return, 2022) (control) on how to fill out the property tax declaration on error rate reduction. The learning costs are operationalised as the error rate made by an individual in the form. We assume that if the individual understands the instructions, they will make fewer errors in the form. To measure the effects of the guidebook on the error rate in the property tax declaration form, we conducted a laboratory quasi-randomised experiment with a between-subject design setting.

Laboratory experiments are the least frequent methodology in administrative burden studies (Halling & Bækgaard, 2022), yet they could provide evidence of causal relations. We used the MoF instruction as a baseline (control group) because it is the only official source of instructions on the property tax declaration. We expected that the guidebook that employed simplification and highlighting of information would reduce learning costs connected to filling out the property tax declaration. Therefore, we hypothesised that the study subjects who use the guidebook (treatment) would make fewer errors in the form than those who use the instructions from the MoF.

The experiment was conducted in seven separate sessions (Table 1), and we recruited 43 young adults (31 females), all students of the European Studies and Public Policy programmes at the Faculty of Social and Economic Sciences, Comenius University in Bratislava. Their attendance was rewarded with a € 15 bookstore voucher. The mean age is 22 years, and the overrepresentation of women reflects the gender distribution at the Faculty of Social and Economic Sciences, where the experiment was conducted. We claim that the recruited subjects are likely to submit the property tax declaration in the future and are more likely to use the online guidebook than older adults, which makes them appropriate subjects for the experiment.

Table 1:
Session timeline and participants

Time	Group	Gender (females)	mean age	Previous experience with filling out a property tax declaration
Session_1 14/12/21	Treatment (Guidebook)	50% (4)	20	0% (0)
Session_2 17/12/21	Control (Instructions from MoF)	63.5% (7)	21	9% (1)
Session_3 20/12/21	Treatment (Guidebook)	80% (8)	23	0% (0)
Session_4 21/12/21	Control (Instructions from MoF)	50% (1)	20.5	0% (0)
Session_5 25/11/22	Treatment (Guidebook)	100% (5)	23.4	0% (0)
Session_6 9/12/22	Control (Instructions from MoF)	100% (2)	23.5	0% (0)
Session_7 19/12/22	Control (Instructions from MoF)	80% (4)	22.2	20% (1)

Source: Authors' own, 2023.

The study subjects were randomly assigned to control or treatment groups. They self-selected a preference for the most suitable date (offered in the recruitment form) to participate in the study. At random (tossing a coin), we then decided which group (control or treatment) would be the first session. Due to the restrictions of the Covid-19 pandemic and the state of emergency, all sessions were online via the MS Teams platform. The study subjects were separated into individual meeting rooms (breakouts), shared the screen throughout the entire session, and the sessions in the rooms were recorded and stored with the consent of all subjects. Most of the study subjects used personal laptops, and only two subjects used tablets or two screens. The variation in technical equipment and technical skills of the individuals could slightly influence the error rate. We did not measure the technical skills of the study subjects.

All experiment sessions had the same structure: they were facilitated by two researchers and the subjects ought to fill out a property tax declaration based on the materials provided, such as an empty pdf form and guidebook/instructions (for further information, see Supplement A). After the activity, the study subjects from the treatment group were asked to complete an online survey of user experience (see Supplement B). The survey was anonymous and composed of four Likert 7-point scale questions on user experience and two open questions (pros and cons of the guidebook). The response rate was 96%.

We coded the uploaded property tax declarations submitted by the respondents in

Microsoft Excel. Our dependent variable is the number of errors (error rate), incorrectly filled fields. We evaluated the error rate of the information in the tax declaration form for each study subject. The total number of fields evaluated on each property tax declaration form was 64, and each field was evaluated separately. The evaluation was ex-post structured into three parts (Introduction, Section II., Section IV), mimicking the structure of the tax declaration form, to obtain more meaningful insights into the effectiveness of the guidebook. The mandatory fields also included two tables (in Sections II, IV.), where individual columns were evaluated as separate fields. The computation of t-tests and the linear regression were performed in the R program.

Table 2:
Summary of the experiment

Sample size	43
Dependent variable	Number of errors (numeric)
Treatment groups	Treatment group (A – Guidebook, N=23) Control group (B – MoF instructions, N=20)
Randomisation method	Quasi-random self-selection for one of seven experimental sessions
Control variables	Time of the session (numeric) Experienced in filling out the form prior to the study session (dummy, 0 – no experience, 1 – previous experience) Age (numeric) Gender (dummy, 0 – male, 1 - female)

Source: Authors’ own, 2023.

4. Results

Table 3 provides an overview of the descriptive statistics. The data show that most of the study subjects used the full allotted time to complete the task (65 minutes). However, we observe a more significant standard deviation in the treatment group (Guidebook), suggesting that some study subjects tended to finish the task earlier than those in the control group (MoF Instructions). Two study subjects (in the control group) had previous experience filling out the property tax declaration. This previous experience could potentially improve the overall score for the control group because a subject with experience could have a better score. Those study subjects with experience in filling out a property tax declaration achieved 46 (above the average score), and 39 (below the average score), respectively. Furthermore, Table 3 shows a considerable difference in the mean score and the mean number of errors (error rate) between the groups. The error rate suggests that, on average, the study subjects who used the guidebook made

substantially fewer errors than those who used the MoF Instructions. The average error rate in the control group was approximately 21 compared to 10 in the treatment group.

Table 3:
Distribution of respondents by groups

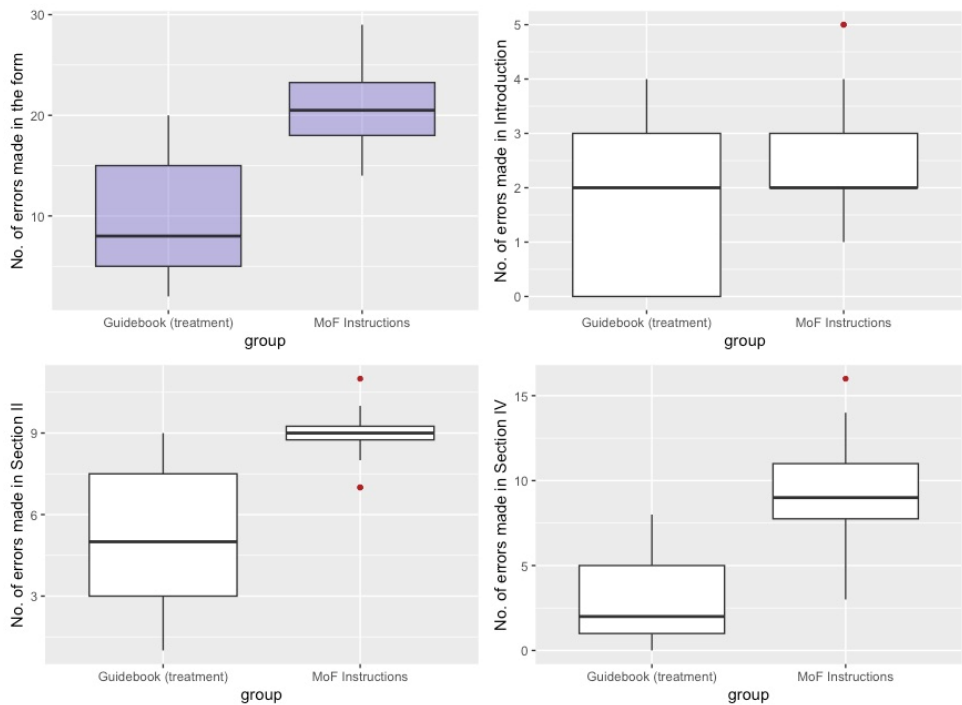
	<i>Gender - Female</i>	<i>Mean age (SD)</i>	<i>Previous experience with filling out property tax declaration</i>	<i>Mean time of completion (SD) in minutes</i>	<i>Mean score (SD)</i>	<i>Mean number of errors (SD)</i>
Treatment group (A – Guidebook) (N=23)	74% (17)	22 (3.02)	0% (0)	63.6 (11.9)	54.7 (5.8)	9.6 (5.6)
Control group (B – MoF Instructions) (N=20)	70% (14)	21.65 (1.53)	10% (2)	61.0 (6.7)	43.3 (3.7)	20.7 (3.7)

Source: Authors’ own, 2023.

Figure 1 shows four boxplots that visually illustrate the performance of the study subjects in filling out the property tax declaration in three sections and groups. The purple boxplot (left upper corner) visualises the results for the entire form (all three sections). The other boxplots show the results for each section of the form, Introduction (general information about the taxpayer), Section II. (information about the land), Section IV. (information about the flat and garage). This division mirrors the structure of the form. The median number of errors for the study subjects of group A (Guidebook, median=8) was more than two times lower than the number of errors in group B (Instructions from MoF, median=20.5). The difference between the treatment group (M=9.6, SD=5.6) and the control group (M=20.7, SD=3.7) is statistically significant, with a mean difference of nine fewer errors in favour of the guidebook users ($t(43)=7.74, p<0.001$).

Looking at the spread of the data and interquartile range statistics (height of the boxplot), we observe that the range of number of errors made in the property tax form is more significant in the treatment (Guidebook) group than in the control (MoF Instructions) group. The above shows that although some study subjects in the treatment group made only a few errors, other study subjects performed much worse and made a similar number of errors as the study subjects in the control group. In other words, the variance in performance, especially in the treatment group, suggests that the guidebook improved performance on average for most, but not of the same magnitude, which may be due to various levels of the study subjects’ digital skills (working online with multiple documents), or the ability to work under time constraints.

Figure 1:
Number of errors made in the property tax declaration form



Source: Authors' own, 2023.

There are significant differences in the results (error rate) in Sections II. and IV. The guidebook significantly improved the performance of the study subjects in Section IV (bottom right boxplot). The number of errors of the study subjects in the treatment group ($M=2.9$, $SD=2.7$) is three times lower than in the control group ($M=9.2$, $SD=3.1$) ($t(43) = 6.9$, $p<0.001$). The number of errors made by the study subjects in the treatment group ($M=5.2$, $SD=2.5$) is approximately 40% lower than in the control group ($M=9.0$, $SD=1$) in Section II of the property tax form ($t(43) = 6.6$, $p<0.001$). On the other hand, we observe a statistically significant but relatively small difference in the number of errors made by study subjects in the Introduction section of the property tax form. The study subjects in the treatment group ($M=1.5$, $SD=1.4$) made a lower number of errors than those in the control group ($M=2.6$, $SD=1.1$) ($t(43) = 2.6$, $p=0.013$). However, the mean difference is only one error. In other words, both the MoF instructions and the guidebook work similarly effectively in the section where users fill in data about the taxpayer. Information about the taxpayer (e.g. name, address, identification number) is straightforward to fill in. The data suggest that two of the most problematic fields in this Introduction section of the property tax form are the year and the type of property tax

declaration. These are fields where many study subjects made errors in both groups but fewer in the treatment group.

The results of the group comparisons align with the results of linear regression (Table 4). The model suggests that the guidebook improves a study subject's performance when the error rate tends to be lower by 11 errors compared to the control group (reference group). Previous experience with property tax declaration, study subject age and completion time does not have a statistically significant effect on the error rate in filling out the property tax form. However, the model shows that the male study subjects made fewer errors than the female study subjects, which may be an interesting hypothesis to test in the future.

Table 4:
Linear regression

<i>Predictors</i>	Error rate		
	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	20.87	5.26 – 36.47	0.010
Treatment [guidebook]	-11.21	-14.03 – -8.38	<0.001
gender [male]	-4.31	-7.62 – -1.00	0.012
time	4.78	-4.43 – 13.99	0.300
experience [y]	1.94	-4.77 – 8.65	0.561
age	-0.18	-0.75 – 0.39	0.524
Observations	43		
R²/R² adjusted	0.689/0.647		

Note: The outcome variable is the error rate in the property tax form. The predictor is the dummy variable treatment. The reference levels for treatment are the control group (MoF instructions), for gender, female, and for experience, no experience.

Source: Authors' own, 2023.

The model is in the correct functional form (reset test, $p>.05$).

No multicollinearity (VIF), VIF below 10.

No heteroskedasticity (the errors have constant variance) in the model (bp test, $p>.05$).

The most extreme outlier has a Cook's distance value of 0.16.

The user experience (UX) follow-up survey results suggest an upbeat assessment of the guidebook by the study subjects. The median values (7 is the highest value) for clarity and general satisfaction with the guidebook were 6. The median values for the other two items, recommendations to relatives and the usefulness of visual illustrations, were 7. Overall, the mean value of the user experience was 6.3 (SD=0.62), which indicates that the study subjects rated the experience very positively. More significantly, the most valued were the colourful illustrations, bolded key information, and detailed but clear and straightforward instructions. However, some of the study subjects pointed out that the final land area calculation remained a complicated operation.

5. Discussion

Bækgaard and Tankink (2021) note that there is little attention in the literature to measure the experiences of individuals when they face administrative burdens. Individual experiences are often left out of empirical research. Moreover, there is little focus on positive experiences when interacting with the state. Our study addresses several gaps. This mixed-method research shows that behavioural insights such as simplification of instructions and highlighting information can reduce the administrative burden. Specifically, the learning costs, along with improving the user satisfaction of users who fill out forms, and so improve experience in interaction with the state. Based on the research sample of young Slovak adults, we suggest that these positive effects will be primarily for the young adult population, who may have a higher level of confidence in using a computer and working with digital documents, but a lower level of experience in filling out forms than older users. In addition, Halling and Bækgaard (2022) point out that most of the research on administrative burden is conducted in Western countries which have specific situations in terms of public service motivation, capacities and capabilities to cope with administrative burden. Therefore, the perspective from a Central Eastern European country is a relevant contribution to the literature. Crivelli (2019) compared the strength of tax administration relative to GDP and found that Slovakia, Czechia and Poland underperform. Their tax administrations are relatively weaker than in Slovenia or Hungary, and one reason is poor online services. In addition, several studies (Vítek, 2008; Klun, 2003), have analysed the costs of taxation in the region. For example, Nemec et al. (2015) showed that the administrative costs of the Slovak tax system are higher compared to other CEE countries.

Moreover, the administrative costs of collecting the property tax as a percentage of tax revenues are one of the highest compared to other taxes (ibid.), which suggests that the agenda of property tax is relatively complex and time-consuming for local tax authorities. In this context, our contribution is based on analysis and reducing learning costs, which we claim to be very closely connected with compliance and psychological costs within the administrative burden concept.

Our results suggest that simplification and highlighting key information are effective interventions in reducing the error rate in the property tax form. Simplifying instructions, simplified explanations of categories (types of property tax declaration, the year to which the tax declaration relates, type of owner, and the like) and highlighting key information by making it easy to understand can reduce learning costs (Linos et al., 2022; Moynihan et al. 2022; BIT, 2015). The observational character of the study enables one to identify the most problematic parts of the form up to the level of specific fields. The results suggest that the guidebook effectively improves accuracy in simple tasks but has somewhat limited effects in more complex tasks, such as mathematical operations (computation of land area). Thus, this study provides valuable insights for the improvement and further development of an electronic version of the property tax declaration with behavioural support and a built-in calculator of property and land size.

The differences in number of errors between the treatment (Guidebook) and control (MoF instructions) groups are significant in more cognitively demanding parts of the form, where calculations and more sophisticated input are required. Despite this, none of the study subjects filled out the form completely (100%) correctly. One of the reasons could be the time limit (65 minutes). An extra 10 or 15 minutes could have improved the accuracy. The fact that most study subjects used the full allotted time to complete the task in both the treatment and control groups indicates room for improvement in the guidebook. Even one error means that the taxpayer will be contacted by the tax administration and asked to correct the declaration, which implies costs on both sides, administration and citizens.

The study has several limitations. Although power analysis shows that the risk of incorrectly rejecting the null hypothesis is low (see Supplement C), a larger, less homogeneous and more representative sample would increase the external validity of the results and rule out the possibility that positive effects are due to chance or sampling error. The study subjects were recruited from among university students. However, their age, computer skills and inexperience in filling out the property tax declaration made them relevant subjects for this study. We argue that the sample of young Slovak adults does not substantially bias the results because this is the population of potential users of the online guidebook, and they are very likely to submit a property tax declaration in the near future. The pandemic did not allow in-person testing in the laboratory; therefore, we used the MS Teams online platform, which allowed control of the study subjects. Variability in the study subjects' computer skills (e.g. working with multiple open documents) may have partially influenced the time needed to solve the task.

6. Conclusion

Although the MoF regulates the property tax declaration, the local administration has several options on how to reduce the administrative burden for the taxpayers. One

strategy can be the simplification of instructions and highlighting key information. This paper shows that this strategy might significantly reduce the error rate and improve user satisfaction when interacting with the tax administration.

A guidebook or personal assistance is a legitimate and feasible short-term strategy to reduce administrative burden. However, developing the guidebook is a time and resource-demanding activity and requires tax administrators' active participation and collaboration. As already mentioned in the methodology section, the estimated costs of developing, designing, and implementing the guidebook were € 2,700, which is a negligible investment in the context of the total annual property tax collection for residential and non-residential properties in Bratislava (€ 8.3 million). Tax administrators have insights into the procedures and logic of tax calculation and the related legislative details. Furthermore, the tax administrator participation creates a sense of ownership of the intervention that facilitates mental alignment among stakeholders and encourages immediate adoption of the intervention into practice after the experimental testing. All this may be one of the reasons they applied research with a direct positive implication for public administration. The final version of the guidebook was published on the official city of Bratislava website (Instructions for Completing and Submitting a Tax Return for Real Estate Taxes - Guidebook, 2021) in 2021 and later in 2022, when the city created a new web site for the property tax agenda, ensuring the guidebook has been placed as the first post in a prominent place. This visible placement helped to increase the outreach. The guidebook was viewed more than 20 thousand times in 2022 and 12 thousand times in January 2023 alone, when most people submit their property tax declaration. The average user satisfaction collected through the feedback form is 6.2 (7 as a maximum value). In addition, the guidebook received a universal design and is available and accessible to any citizen, regardless of where in the city they declare ownership of a property.

However, this approach has its limits and is less effective in tasks that are more cognitively demanding. Moreover, reducing learning costs might not always directly decrease the error rate. There may be other potential barriers or reasons to fill out the form incorrectly. Local administration should therefore consider simplifying tax agenda processes (Pita & Močević, 2018) and specific measures such as prepopulated fields in forms or automatisations. Prepopulated fields in tax forms are effectively a default that simplifies the process and can reduce non-compliance (Fonseca & Grimshaw, 2017). Fonseca and Grimshaw (2017) note that compliance can be boosted if prepopulation goes hand-in-hand with reactive nudges (e.g. norm message).

On the other hand, automatisations means that all the paperwork is handled by the administration and the citizens are contacted by the administration only to check the accuracy of the information and to pay the tax. However, the availability of accurate administrative data and a solid IT infrastructure are prerequisites for automating this procedure. Digitalisation is associated with transaction costs related to the design and implementation of new processes (Dobrolyubova, 2021). Although digitalisation and the introduction of e-Gov systems are primarily client-oriented and decrease the

administrative burden for citizens, it also simplifies internal administrative processes long-term (Hajnal et al., 2018), which could have positive effects on both the public administration and the industry sector and their cooperation (ibid.).

Acknowledgment

This work was supported by the Slovak Research and Development Agency under the grant (APVV-18-0435) Behavioural Interventions in Local Government: Increasing the Efficiency of Local Public Policies.

We would like to thank Slavomír Oslej and Silvia Čechová at the City of Bratislava for their help with the design and implementation of the experimental testing.

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Appendix – Supplements

Supplement A: Description of instructions provided to study subjects

The sessions of the experimental design began with the introduction and explanation of the purpose of the session, namely, to fill out a property tax declaration based on materials that would be provided to the study subjects. One of the researchers introduced all the materials – property tax in pdf form, MoF instructions/guidebook, property ownership documents, and information about the fictitious owner. The fictitious owner is Mária Barillová, a fictive female resident of Bratislava who recently bought a flat with a parking space, which she must now declare in the property tax declaration. The story (provided orally and in pdf form) involved all the specific information a taxpayer needs to complete the property tax declaration successfully. The task for the study subjects was to fill out the property tax declaration form for the fictitious owner. The study subjects had to use only the materials provided at the beginning of the session. An Internet search was not allowed, and the research team randomly checked the work of the study subjects (by visiting the meeting room at approximately 2-minute intervals). Before starting, they were asked to try to access the materials and verbally validate the access to the documents. The task had a time limit and transparency condition: participants had 65 minutes to complete the task. The end of the time limit was announced 10 minutes in advance. After the end of the time limit, the study subjects were asked to save their work (the pdf form) regardless of their progress and upload it to their meeting room so it could be stored and later analysed by the research team.

Supplement B: User experience

The feedback form on the guidebook was composed of four Likert seven-point scale questions. We computed a variable of user experience (UX) as the mean value of all four items in the feedback form. Cronbach's alpha, which is a measure of internal consistency, is at a level of 0.79 that indicates a high level of internal consistency. Cronbach's alpha was calculated in the R program (package 'psych').

Questions in the feedback form:

To what extent was the guidebook easy to understand for you?

Indicate on a scale of 1 – completely incomprehensible, 7 – completely comprehensible.

How would you rate your satisfaction with this guidebook?

Indicate on a scale of 1 – completely dissatisfied, 7 – completely satisfied.

To what extent would you recommend this guidebook to your relatives if they need to complete a DP for a property?

Indicate on a scale of 1 – definitely not recommended, 7 – definitely recommended.

How would you rate the usefulness of the visual illustrations in the guide?

Indicate on a scale of 1 – not useful at all, 7 – very useful.

Supplement C: Power Analysis

Cohen’s delta is a measure of the effect size, indicating the magnitude of the difference between two means. In the R program, Cohen's delta can be calculated by subtracting the mean of one group (control group) from the mean of another group (treatment group) and dividing the result by the pooled standard deviation.

We used the ‘cohen.d()’ function from the ‘effsize package’ to calculate the effect size. The function returns a value of 2.299713, representing the effect size (the standardised difference between the means of the two groups). Cohen's d value of 0.8 or greater is typically interpreted as a large effect size.

To calculate the power of a test in R, given the effect size (Cohen's delta), sample size, and group means, you can use the ‘pwr.t2n.test()’ function from the ‘pwr package’. The ‘pwr.t2n.test()’ function returns a list of values, including the calculated power. In this example, the calculated power is 0.9934237, which means that there is a 99.3% chance of correctly rejecting the null hypothesis if the alternative hypothesis is true, given a sample size of 43, an effect size (Cohen’s delta) of -2.299713, and group means of 23 (treatment group) and 20 (control group).

Figure 2:

Calculation of the power of the t-test

