E-Learning Software: Comparing the use Behavior Among Academicians and Schoolteachers

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Abstract: The COVID-19 pandemic has caused an increase in the use of e-learning software. From the perspective of the decision-makers (school/university administration), it is crucial to understand what characteristics of the software are perceived by the users (teachers) as necessary for a task (e-learning). A popular method of determining these characteristics is a technology acceptance model. In this paper, the authors aim to understand the technology acceptance of Microsoft (MS) Teams by applying the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The authors also analyze acceptance in two distinctive groups of teachers: schoolteachers and academic teachers, to better understand differences in e-learning software acceptance and implementation. The results show that MS Teams is a well-accepted software and the users' intention to use MS Teams in e-learning is the same regardless of the teacher's group. There are significant differences in the perception of software characteristics between different groups. The authors analyze the potential causes of these differences and suggest practical implications for improving the quality of e-learning. The intent is not to validate UTAUT as a general technology acceptance model but to understand its practical importance in explaining use behavior in e-learning.

Keywords: e-Learning, Technology acceptance, MS Teams, Use behavior, Structural equation modeling

1. Introduction

The COVID-19 pandemic has forced teachers worldwide to switch from stationary learning to e-learning (Mulla et al., 2020). One of the essential choices they faced was selecting the computer program they wanted to use to carry out e-learning activities. However, the teacher or the person in charge of the institution made the final decision. The question arises about the criteria that were used in making this decision. A technology acceptance theory provides an answer to this question. In the framework of this theory, a set of beliefs and expectations towards a technology influences users' intention to use it. The stronger the intention, the more efficient the realization of a task for which this technology is used. A good understanding of technology acceptance can also help explain teachers' perception of used software, its strengths and weaknesses, the necessary IT competencies required to use it, and external variables, like work experience, that drive its acceptance.

There are many computer programs in the market for e-learning. These include MS Teams, Zoom, and Google Meet. The authors focused on MS Team as it is the most widely used e-learning software according to several researchers (Gauthier and Husain, 2021). The authors' goal is not only to show technology acceptance but also to conduct an analysis in which schoolteachers with academic teachers were compared and investigate the differences in beliefs and expectations towards technology.

The authors believe that teachers are essential in studying technology acceptance because they decide how the curriculum will be implemented in online classes. The teacher's beliefs and expectations determine which e-learning program will be used.

2. Theoretical Background and Related Research

Technology acceptance fundamentally concerns how people adapt certain technologies for a given use. The level of user acceptance is considered crucial when it comes to the design and development of new technology. Finding the determinants of the technology use and identifying the motivations of its users is vital in finding methods to design the technology better and predict its reception among users (Taherdoost, 2018). Various models and frameworks have been developed to study technology adoption among users. Some of the most widely used models include the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975), which was the basis for one of the most important acceptance models, the Technology Acceptance Model (TAM) (Davis, Bagozzi, and Warshaw, 1989).

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Research on the acceptance of a particular educational technology is still in its nascent stage. Studies on the intensity of e-learning meeting platform use and level of acceptance have begun to gain popularity in the new era of distance learning. They typically focus on examining the acceptance level of a single e-learning online video meeting platform like Google Classroom (Fauzi et al., 2021; Bervell et al., 2022) or Zoom (Wijaya, Solikhatin and Tahyudin, 2021). One of the objectives of this research is to determine and explain the behavioral intention to use MS Teams software as e-learning software. It was decided to use the Unified Theory of Acceptance and Use of Technology (UTAUT) model proposed by Venkatesh et al. (2003) for this task. UTAUT is based on the theoretical framework of the previously mentioned models, and its multi-theoretical approach is conducive to achieving a broader understanding of the issue of technology adaptation that has been unattainable individually by previous models (Khecine, Lakhal, and Ndjambou, 2016).

UTAUT model was selected for this study due to its high explanatory power, high reliability, and ability to correctly predict user behavior (Schaper and Pervan, 2007; Khecine, Lakhal, and Ndjambou, 2016). The UTAUT model conceptually incorporates four constructs that determine Use Behavior, which measures the level of acceptance of technology among users. The predictors of this acceptance are the following latent variables: (1) Performance expectancy (PE), (2) Effort expectancy (EE), (3) Facilitating conditions (FC), and (4) Social influence (SI) (Venkatesh et al. 2003). Each construct defines a different technology dimension from the user's perspective. Performance expectancy (PE) is the user's belief about the usefulness and effectiveness of a given tool in his/her work; PE describes the degree to which the user perceives the potential to gain benefits for the task at hand by using the technology. Effort expectancy (EE) refers to the ease of use of a given tool and the user's belief that there is no need for specialized knowledge and that the technology can be mastered intuitively and easily. Social influence (SI) determines the level to which users perceive the influence of their social circle regarding their use of a given technology. Finally, Facilitating conditions (FC) measure the impact of technical and organizational infrastructure on the user's perception of its helpfulness in using a given technology (Venkatesh et al., 2003).

In the context of this study, within each construct, the level of agreement with the given items concerning MS Teams is measured. The constructs respectively measure the perception of MS Teams as making e-learning more effective and better (PE) or being an easy-to-use software (EE). The recommendation to use MS Teams by school authorities, colleagues/colleagues, or the overall prevalence of software use and its impact on users is measured as SI. Lastly, in this study, FC are defined as coaching and training offered by school authorities or help from colleagues or students regarding MS Teams.

Empirical applications of the UTAUT model over the past 20 years have been prevalent. Worth mentioning is the development of a subsequent version of the model, UTAUT 2 (Venkatesh, Thong, and Xu, 2012), which incorporates an additional three variables measuring technology acceptance: Hedonic motives, Price value, and Habit. It was further developed when Farooq, et al. proposed the so-called UTAUT 3 (2017), which expanded the previous model iteration to include a new construct, Personal innovativeness. The authors do not think these additional UTAUT variables are helpful in the context of online education software, so the classical UTAUT model was chosen. The extended UTAUT models and their variants were also used as a framework theory to analyze the acceptance of e-learning platforms. Alshammari (2021) modified the UTAUT model to investigate the determinants of virtual classroom use among university teachers. The model was augmented with the construct Mobility, but only PE and EE significantly affected BI. A study by Gunasinghe, et al. (2019) further tested the effectiveness of the UTAUT3 model in measuring and interpreting the level of online learning adoption among Sri-Lankan academics. However, the model proved to be inappropriate for research in this context. The UTAUT3 used by the researchers explained only 38% variance of BI and 19% of Use Behavior, implying an overall structural model as a weak tool to predict academic teacher acceptance of e-learning. This is why the UTAUT3 model was not selected as the theoretical framework in our study. At the same time, UTAUT2 was not chosen due to its inclusion of a price variable, which is not fully applicable in the context of our study. Other studies using the UTAUT model or parts of it have not always focused on platforms like Zoom or Microsoft Teams but often on other educational ICT platforms like Moodle (Saleem, Al-Saqri and Ahmad, 2016; Abbad, 2021), Massive Open Online Courses (MOOCs) (Altalhi, 2021), Virtual Learning Environment (Raman and Rathakrishan, 2018), Wikis (Yueh, Huang, and Chang, 2015), or teaching and learning concepts using technology like blended learning (Bamoallem and Altarteer, 2021, Chan et al., 2015), or flipped classroom (Agyei and Razi, 2021).

Reflecting the currently developing need to analyze the technology acceptance of platforms like Zoom and Microsoft Teams and the emerging interest of researchers in measuring their acceptance among its users, it was decided to investigate the acceptance level of Microsoft Teams among groups of teachers. This is due to the slight prevalence of research on measuring educational technology acceptance levels among students (Yee and Abdullah, 2021, Magano et al., 2020) and the intention to measure and contrast acceptance levels among two

distinct groups of teachers: schoolteachers and academic teachers. The teachers may perceive the software in very different ways due to the nature of their teaching, which may translate into their technology use. This context of the study can provide important insights into the perceptions of Microsoft Teams software by two groups and identify differences and similarities between them. Additionally, in this model, the authors include a new moderator, work experience, which can influence the strength or valence of relationships among variables.

3. Research Questions

The authors' previous discussion leads them to two main research questions:

- *Q1*: How can behavioral intention to use MS Teams be explained?
- *Q2*: How does technology acceptance of MS Teams differ between two important user groups: academic teachers and schoolteachers?

The answer to the first question is crucial because it can provide the information needed to analyze the factors influencing the intention to use a given computer program. Knowing what factors are essential for users, the strengths and weaknesses of the program can be discussed, as the changes that can be made to improve its acceptance and the potential market value. One can also divide these influencing factors into those under the program developers' or providers' control and those over which they have no influence. In the UTAUT model, factors under control are predictor variables, while those out of control are moderator variables. The importance of the second question requires a more detailed analysis. Based on previous research (Smolinsk et al., 2022) and authors' experience, four factors were identified as contributing to differences in technology acceptance in those two groups. These are teacher education, course types, student age, and teaching objectives.

3.1 Teacher Education

First, the differences in the technology acceptance in both groups may stem from the didactic preparation. Among those teaching in schools, pedagogical and vocational education are predominant. However, a pedagogical qualification among academic teachers is rare. Most university teachers have yet to become familiar with various teaching methodologies, sometimes resulting in reduced teaching competencies. The authors would expect to see a difference in technology acceptance between schoolteachers and those employed at universities. Those differences may be especially salient in the expectations towards program 'performance', with schoolteachers needing lower performance and thus having lower PE.

3.2 Course Types

The following reason for the difference in technology acceptance between the two groups is the course form. In schools, classes are most often conducted in a uniform formula of exercises. However, there is a clear division between lectures, workshops, and university seminars. Although the same functionalities of e-learning software are used in all forms of courses, their level of use varies considerably. The functional requirements for computer programs used for e-learning should be higher at the university level. Furthermore, that requirement might be reflected in higher PE in the academic teacher group.

3.3 Student age

Another critical factor is the age of students. Younger students may be less acquainted with e-learning technology, and the schoolteacher must opt for more accessible software. As a result, Effort Expectancy may become a more salient variable in the teacher group.

3.4 Teaching Objectives

The last differentiating factor is the teaching objective. In education, the emphasis is mainly on the transmission of knowledge. In higher education, the objective is more complex, with workshops, practical exercises, and internships also playing a crucial role. For instance, the broader objective of higher education may find its reflection in the more significant effect of PE on BI.

These differentiating factors imply the need to use the functionalities offered by e-learning software to a different extent and with a different intensity in both groups, leading to significant intergroup differences.

4. Hypothesis

H1: Performance expectancy positively affects the behavioral intentions to use MS Teams in e-learning.

H2: Effort expectancy positively affects the behavioral intentions to use MS Teams in e-learning.

H3: Social influence positively affects the behavioral intentions to use MS Teams in e-learning.

H4: Facilitating conditions positively affect the behavioral intentions to use MS Teams in e-learning.

These hypotheses are fundamental because they tell us which UTAUT variables impact technology acceptance of the software under study. The additional hypothesis for moderation effects in the model can also be formulated:

H5: All four predictor variables are moderated by work experience.

To answer the second question, the authors analyze both groups regarding their technology acceptance. Due to a lack of knowledge of the existence of any studies that investigated differences in technology acceptance between academics and schoolteachers, the general exploratory hypothesis can be formulated, which is as follows:

H6: There are differences between academic teachers and schoolteachers regarding technology acceptance of MS Teams in e-learning.

5. Methodology

The authors have conducted a structural equation analysis (SEM) for both study groups to answer the first research question. SEM is a common research design for UTAUT models (Alshammari, 2021). SEM aims to see if a theory (UTAUT) explains the "pattern" observed in the data well. This pattern (questionnaire responses) is assumed to reflect the actual relations occurring in the population. If this is the case, the model/theory the authors postulate will display a good "fit" to the data set. To answer the second research question, a multi-group SEM was conducted. This analysis involves the simultaneous evaluation of the postulated model in two research groups and the successive restriction of specific model parameters to detect statistically significant differences. Imposing restrictions is commonly divided into four stages: congruent invariance (theoretical model), metric invariance (factor loadings), scalar invariance (intercepts), and strict invariance (residuals).

Because this analysis relies on a full structural equation model with regression relations between major latent variables (H1 to H4), regression invariance was also introduced, which imposes restrictions on regression coefficients. In the authors' view, this is the most important invariance test for this study because it can tell whether the effects of four major UTAUT variables on behavior intention differ between the two groups.

5.1 Participants

The sample comprises 964 teachers from Poland and consists of two sub-samples: academic teachers (n = 245) and schoolteachers (n = 719). The first sub-sample comes from previous research by (Smolinski et al., 2022) where the questionnaire was administered to the employees of selected universities in Northern Poland. The second sub-sample was collected via professional social media pages for schoolteachers in Poland. Participation was voluntary and anonymous.

5.2 Preliminary Analysis

The first two responses with missing data from the schoolteachers' sub-sample were eliminated. Next, IRT analysis based on Guttman errors (van der Flier, 1977) was conducted to eliminate aberrant responses. The number of responses that did not meet the established criterion of $G < 0.4$ was 8 from the Academia sub-sample and 29 from the schoolteachers' sub-sample. One response with work experience above 50 years was detected as an outlier and consequently removed from the schoolteachers' sample. Two sub-samples containing 237 responses (female = 55%; mean job tenure = 15.79, SD = 11.22) and 689 responses (female = 94%; mean job tenure = 19.87, SD = 10.31) for academia and schoolteachers, respectively were established.

5.3 Measurement Instrument

UTAUT questionnaire for MS Teams created and validated by (Smolinski et al., 2022) was used. In this study, the questionnaire has reached satisfying psychometric properties represented by factor loadings and reliability measurements (see Table 1). The factor loading for the item FC2 is below the recommended value of 0.7 in both groups. However, it has reached a significant p-value ($p < 0.001$), and it was decided to keep it in the analysis. The exclusion of the FC2 item would reduce the number of items measuring the Facilitating conditions construct to 3 (which should still be enough). However, a few points of additional variance explained by item FC2 can only help understand the measured construct and do not harm the analysis results.

Table 1: Model Reliability and Factor Loadings

		Congruent model				Final restricted model	
		Group 1: Academia		Group 2: School teachers		Multigroup	
Latent construct	**Item**	**Factor Loading**	**Alpha**	**Factor Loading**	**Alpha**	**Factor Loading (unstandardized)**	**Alpha**
Performance Expectancy (PE)	PE1	0.815	0.87	0.885	0.93	1.000	0.91
	PE2	0.919		0.955		1.318	
	PE3	0.866		0.936		1.314	
	PE4	0.769		0.837		1.390	
Social Influence (SI)	SI1	0.813	0.80	0.796	0.87	1.000	0.86
	SI2	0.812		0.876		0.955	
	SI3	0.720		0.851		0.929	
Effort Expectancy (EE)	EE1	0.793	0.89	0.802	0.89	1.000	0.89
	EE2	0.912		0.906		1.138	
	EE3	0.728		0.770		0.929	
	EE4	0.832		0.825		1.184	
Facilitating Conditions (FC)	FC1	0.704	0.77	0.684	0.73	1.000	0.73
	FC2	0.561		0.573		1.276	
	FC3	0.723		0.813		1.117	
	FC4	0.710		0.628		1.270	
Behavioral Intention (BI)	BI1	0.804	0.88	0.778	0.86	1.000	0.86
	BI2	0.788		0.737		0.931	
	BI3	0.945		0.938		1.095	

Heterotrait-monotrait (HTMT) ratio of correlations to assess discriminant validity was used. A value below a threshold of 0.85 indicates good validity (Kline, 2011). In this case, all values are below that threshold for both groups. Discriminant validity measures are presented in Table 2.

Table 2: Discriminant Validity (HTMT)

	PE	**SI**	**EE**	**FC**	**BI**
PE	1	0.714	0.791	0.680	0.769
SI	0.807	1	0.706	0.659	0.764
EE	0.768	0.732	1	0.814	0.701
FC	0.716	0.699	0.772	1	0.600
BI	0.840	0.830	0.814	0.727	1
Note. Top diagonal: discriminant validity for academia, bottom diagonal: discriminant validity for schoolteachers					

6. Results

All statistical analysis was conducted in R software. The models were validated using a maximum likelihood estimator from package lavaan.

6.1 General Model Validation

The UTAUT models in both groups reach satisfying statistical properties. Fit statistics are presented in Table 3. The presented expected values for fit measures come from Konarski (2010). UTAUT measurement model accurately represents the actual population relations captured in the data. The only statistics that deviate from the expected value are chi-square statistics, which suffer from many drawbacks (Konarski, 2010). First, a chi-square statistic heavily depends on the sample size, and when the sample is too large, the null hypothesis can be wrongly rejected. Second, the more complex models are punished as a chi-square statistic gets inflated with increased degrees of freedom. Third, a chi-square statistic is not a representative fit criterion when data does not have a multivariate normal distribution. Considering all mentioned weaknesses, it is not appropriate to assume a poor model fit based solely on chi-square statistics.

Table 3: Model fit Statistics

Statistics	Critical Value	Academic Teachers	School Teachers	Final Restricted Model
CMIN/DF	< 2	2.165	5.455	3.737
GFI	> 0.8	0.985	0.983	0.980
NFI	> 0.9	0.910	0.931	0.917
CFI	> 0.9	0.949	0.943	0.938
RFI	> 0.8	0.889	0.916	0.912
RMSEA	< 0.08	0.070	0.080	0.077
$\mathbf{R^2}$	N/A	0.800	0.818	0.757
ECVI	N/A	1.682	1.175	1.355
AIC	N/A	11875	33140	45062
BIC	N/A	12097	33430	45501

The statistical significance of the four main effects of the four main variables of the UTAUT model is the same in both study groups (see Table 4). However, it cannot yet be concluded that the effect sizes are identical. PE (H1), EE (H2), and SI (H3) positively affect the intention to use MS Teams in e-learning, regardless of whether the study group is academia or schoolteachers. In contrast, FC (H4) do not affect behavioral intention, regardless of the studied group. FC are not a variable that users consider when deciding whether to use MS Teams in e-learning; hence they do not influence technology acceptance.

Table 4: Model Standardized Regression Coefficients

Pathway	Hypothesis	Academia	School Teachers	Final Restricted Model
PE → BI	H1	β = 0.630 (se = 0.152) ***	β = 0.407 (se = 0.066) ***	β = 0.485 (se = 0.064) ***
EE → BI	H2	β = 0.207 (se = 0.091) *	β = 0.412 (se = 0.412) ***	β = 0.336 (se = 0.057) ***
SI → BI	H3	β = 0.435 (se = 0.087) ***	β = 0.400 (se = 0.055) ***	β = 0.405 (se = 0.049) ***
FC → BI	H4	β = 0.062 (se = 0.127) n.s.	β = 0.040 (se = 0.040) n.s.	β = 0.088 (se = 0.076) n.s.
Note. significance code: < 0.001 '***', < 0.01 '**', < 0.05 '*'				

6.2 Moderation Analysis

The moderation analysis proceeded after establishing that the UTAUT model fits well in both analyzed groups (H5). The method proposed by Steinmetz et al. (2011) was used to create moderator variables in the structural equation model. However, that caused a dramatic decrease in the fit statistics as the model had become too

complex (degrees of freedom increased from 125 for the simple model to 481 for the moderation model). It was still decided to present the obtained moderation coefficients (see Figure 1), as they do not change drastically in value with the decrease in overall model fit and can still provide helpful insight into the mediating nature of work experience.

In this research, the moderation coefficients reached significance only for PE and EE and only in the schoolteachers' group ($\beta = -0.11$, $p < 0.05$ and $\beta = 0.12$, $p < 0.01$, respectively for PE and EE). However, the magnitude of the coefficient is small, and the significance levels are above $\alpha = 0.001$, which may be considered too liberal for this type of analysis. Caution is advised in drawing firm conclusions from the presented moderation results.

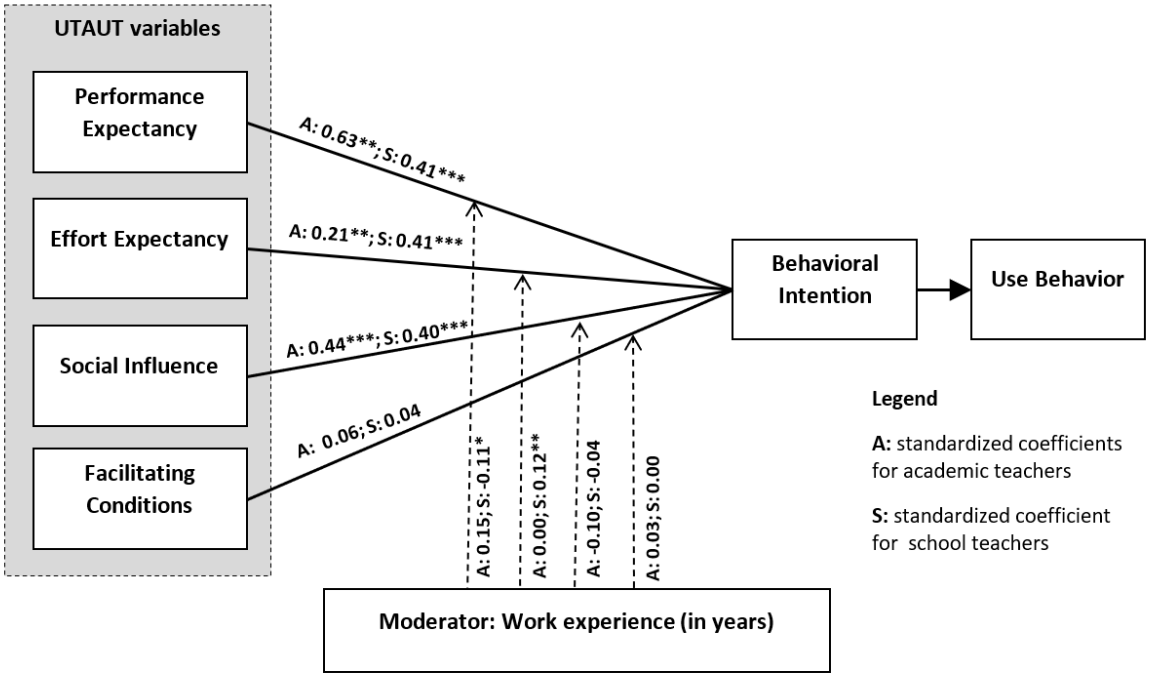

Figure 1: UTAUT Model

6.3 Invariance Analysis

The last hypothesis (H6) regarding the equivalence of technology acceptance in both study groups was verified through five multi-group analysis stages described in the methodology section.

First, the congruent model was analyzed, which showed a good model fit in both groups, indicating that the UTAUT theory adequately explains technology acceptance in both groups (Table 5). In the second stage, factor loading equivalences between groups were imposed. Based on the criteria proposed by Chen (2007) and Rutkowski and Svetina (2014), it was concluded that the resulting metric invariance model is not significantly different from the congruent model ($\Delta CFI = -0.002$, $\Delta RMSEA = 0.00$ $\Delta TLI = 0.00$), suggesting that the latent constructs and their measurement are the same in both study groups.

Next, the model was restricted further to ensure scalar invariance. The results suggest that the perception of specific MS Teams characteristics differs between the two groups ($\Delta CFI = -0.032$, $\Delta RMSEA = +0.008$ $\Delta TLI = -0.015$). After closer analysis, it was determined that the perception of characteristics represented by the items PE1, PE4, FC2, FC3, BI2, BI3 differ in academic teachers and schoolteachers. After allowing these parameters to vary between the two groups, the model fit has returned to the previous values ($\Delta CFI = +0.031$, $\Delta RMSEA = -0.009$ $\Delta TLI = +0.015$). Having assessed scalar invariance, strict invariance on the model was imposed, and it was found that it significantly decreases model fit ($\Delta CFI = -0.014$, $\Delta RMSEA = +0.006$, $\Delta TLI = -0.012$). The parameters responsible for this decrease in fit were PE2, PE3, PE4, FC2, and FC3. It suggests that the perception of MS Teams characteristics represented by these items has higher variance in one group and consequently is less consistent. Freeing these parameters improves model fit ($\Delta CFI = +0.011$, $\Delta RMSEA = -0.006$, $\Delta TLI = +0.011$).

The last stage of analysis focused on regression invariance. The regression parameters were restricted, and it was found that there was no significant decrease in fit statistics (ΔCFI = +0.001, ΔRMSEA = 0.00, ΔTLI = +0.001), suggesting that the effects of four main variables in the UTAUT model do not differ in size between the two studied groups. It is the most critical finding of this study and is discussed in depth in the following sections.

Table 5: Model Invariance Analysis

Model Variant	CMIN	ΔCMIN	Df	CFI	ΔCFI	RMSEA	ΔRMSEA	TLI	ΔTLI
Academia	270.57	-	125	0.949	-	0.070	-	0.937	-
Schools teachers	681.818	-	125	0.943	-	0.080	-	0.930	-
Congruent invariance	952.39	-	250	0.944	-	0.078	-	0.932	-
Metric invariance	997.40	+45.01	263	0.942	-0.002	0.078	0.00	0.932	0.00
Scalar invariance	1216.43	+219.03	276	0.910	-0.032	0.086	+0.008	0.917	-0.015
Scalar released	1010.68	-205.8	270	0.941	+0.031	0.077	-0.009	0.934	+0.017
Strict invariance	1213.35	+202.67	288	0.927	-0.014	0.083	+0.006	0.922	-0.012
Strict released	1067.93	-145.42	283	0.938	+0.011	0.077	-0.006	0.933	+0.011
Regression invariance	1072.60	+4.67	287	0.939	+0.001	0.077	0.00	0.934	+0.001

6.4 Latent Variable Mean Comparison

Additionally, the latent means of the five main UTAUT variables were compared (Table 6). The latent means are created by calculating the mean of all items for a latent variable multiplied by its factor loading. The latent means for each group are presented in Table 6. The results show that the latent means for all four UTAUT predictor variables differ significantly between the two groups. However, most effect sizes are small or medium, with the most significant difference being for SI (Cohen's d = - 0.441). It can be interpreted that these values as the degree to which a particular user's belief, represented by one of the UTAUT four predictive variables, differs between academia and schoolteachers. For example, the most significant difference in EE can be interpreted as a difference in the strength (degree) of the belief that MS Teams is easy and intuitive to use, with schoolteachers believing stronger in MS Teams ease of use. However, the most interesting latent mean is the mean for Behavioral intention (BI), which does not differ between the two groups. It means that the actual intention to use MS Teams in e-learning is the same in both groups.

Table 6: Latent Variable Means

Latent construct	Academia	Schools teachers	t-test	Cohen's d
PE	M = 5.76, SD = 1.47	M = 6.28, SD = 1.48	-4.83***	-0.367
EE	M = 4.74, SD = 1.12	M = 5.09, SD = 1.17	-4.21***	-0.305
SI	M = 4.11, SD = 0.92	M = 4.56, SD = 1.03	-6.31***	-0.441
FC	M = 5.40, SD = 1.19	M = 5.59, SD = 1.18	-2.10*	-0.16
BI	M = 4.45, SD = 1.18	M = 4.48, SD = 1.31	-0.25 n.s.	-0.021
Note. significance code: < 0.001 '***', < 0.01 '**', < 0.05 '*'				

7. Discussion

The results provide us with three main conclusions.

7.1 Technology Acceptance of MS Teams can be Represented by the UTAUT Model

The first conclusion stems from the answer to the first research question: How can behavioral intention to use MS Teams be explained? The UTAUT model proves to be an excellent tool for assessing technology acceptance. Behavioral intention to use MS Teams in e-learning is over 70% explained by the UTAUT model (R^2 = 0.818 in schoolteachers and R^2 = 0.8 in academia), which means that created models provide enough information to decide about the use of MS Teams in e-learning.

This information provided by the UTAUT models can be used by developers or software providers who wish to improve their technology. For example, the presented UTAUT variables can be interpreted in the context of SWOT analysis, where variables positively influence behavioral intention are strengths. In contrast, variables with negative or no influence are evaluated as weaknesses.

Latent means can also be helpful in such analyses. For example, although they do not significantly affect behavioral intention, FC have a high latent mean, suggesting that MS Teams users believe it has good technical support and software infrastructure. Nevertheless, these high 'facilitating conditions' do not affect the intention to use MS Teams for e-learning. Thus, the problem may not lie in the level of support or infrastructure but in users' perception of these 'facilitating conditions' as unimportant.

It is also essential to consider UTAUT moderators, which provide information about external factors beyond developers' and providers' control that still affect users' technology acceptance. Work experience has a significant moderating effect on PE and EE, but only in the group of schoolteachers. The negative effect of work experience on PE means that as experience increases, the importance of PE decreases, i.e., the effect of the belief that MS Teams works well in e-learning on the intention to use the program decreases. It is important to note that those with more experience are often older and thus less familiar with the technology and overall have lower expectations of its performance. However, we advise approaching this interpretation with caution for three reasons: first, the moderation occurs only in the group of schoolteachers, and second, the effect sizes of moderation are small. And third, the hypothesis of a relationship between age and work experience has not been tested in the context of this study. Nevertheless, this conclusion is provided as an illustration of how moderation can be interpreted in the context of UTAUT models and as an impulse for future research.

7.2 Technology Acceptance of MS Teams is the Same in Schoolteachers and Academic Teachers

At the highest level of analysis, the technology acceptance of MS Teams, represented by the effect of the four main UTAUT variables on Behavioral intention, is the same among schoolteachers and academic teachers. The effects of the four main variables are identical in both groups. From the final model, it can also be concluded that the influence of three out of four variables is very similar to each other (standardized β = 0.336 - 0.485), and it is difficult to distinguish a variable with a dominant influence. On the other hand, what can be distinguished is a variable that does not affect behavioral intention in both groups: FC, which may constitute a weakness in SWAT.

All the differences in education systems mentioned in the introduction and research question sections: teachers' educations, types of courses, age of students, and different teaching objectives, do not lead to differences in technology acceptance of MS Teams.

7.3 Perception of MS Teams Characteristics Differ Between Schoolteachers and Academic Teachers

The fact that technology acceptance of MS Teams is the same in both groups does not mean that the perception of MS Teams characteristics is identical. The general conclusion from the analysis of the UTAUT models is that the influence (and direction) of these perceived characteristics on BI is the same. In contrast, the extent to which MS Teams is perceived to have a particular characteristic may differ.

7.3.1 Performance expectancy

The variable with one of the highest differences in perception, measured by Cohen's d, is Performance expectancy. It can be concluded that the degree of perception that MS Teams possesses software characteristics that are useful and beneficial for e-learning is lower among academic teachers. The differences in course types likely explain this variance. The spectrum of courses offered at the university level is broad (workshops, seminars, lectures). On the other hand, the dominant form of courses in schools is standard classes. Given these observations, the lower PE among academic teachers is justified.

7.3.2 Effort expectancy

The difference in the latent means of the Effort expectancy between the groups (Cohen's d = -0.305) indicates that among schoolteachers, the belief that MS Teams is easy to learn and its use is more significant than among academic teachers. This finding might be surprising because, before the COVID-19 pandemic, schoolteachers were almost exclusively classroom teachers. One might expect that this urgent need to master unfamiliar software and reformulate their classes would cause a greater need for the software to be easy and user-friendly than in the academic teachers' group, where there is a higher exposure to various forms of learning. However, it is advised to stay aware that the academic teachers' group had a significantly greater challenge in adjusting various course types to e-learning. Organizing standard classroom exercises via online software is more straightforward than complex workshops.

7.3.3 Social influence

The difference in the Social influence variable equals approximately 0.44 standard deviations. It is the most significant difference in the study and indicates a lower degree of perception among academic teachers that essential people would use MS Teams software. Academic teachers, for the most part, are, at the same time, scientific researchers, often appearing in public as experts. Such persons are professionally tracking the latest knowledge and determining technology development directions. They most often play the role of professional authorities in today's society. Schoolteachers do not require such competencies; therefore, they are more inclined to consider other people as authorities and accept their views as valid or motivating for action. This fact explains that the results obtained among schoolteachers indicate a higher degree of perception of the belief that important people would use MS Teams software.

7.3.4 Facilitating conditions

The difference in the size of the Facilitating condition variable between the researched groups is the smallest among all the variables (Cohen's d = -0.16). School teachers are more likely to believe that support is available. This result is undoubtedly a consequence of the implemented actions on the part of the regional administration overseeing the operation of schools or the managers of individual educational units. On the other hand, academic teachers, due to the specificity of their profession, are more inclined to undertake autonomous activities, attempts, and experiments while relying less on the possibility of receiving support.

7.3.5 Behavioral intention

The Behavioral intention to use MS Teams is not significantly different in the study groups. It means that both groups equally want to use this software for e-learning regardless of the differences in perception of individual characteristics described above.

8. Practical Implications

This section presents the practical implications of the differences described above.

8.1 Performance Expectancy

In terms of Performance expectancy, the lower perception among academic teachers indicates the need for the further development of software to support various forms of teaching, including laboratories and workshops. It becomes necessary to develop digital simulators using elements of artificial intelligence and virtual reality.

School teachers have a lower degree of IT culture (they use MS Teams only for standard online classes) than university teachers. Actions should be taken to verify this thesis. If confirmed, it becomes necessary to plan and implement training to increase schoolteachers' knowledge, skills, and competencies in modern information technologies.

8.2 Effort Expectancy

Noting small but significant differences in the perception of Effort expectancy, it is recommended to increase the number and scope of MS Teams training for academic teachers. It is important to show how an academic teacher can apply the software to the advanced requirements of the academic didactic processes.

8.3 Social Influence

To increase the perception and potentially the effects of Social influence, teachers, software designers, and providers can implement selected principles described by Robert Beno Cialdini (2004). The following rules may

be applied: authority, social proof, commitment, and consistency. The primary purpose of these initiatives should be to present MS Teams in a manner that creates favorable conditions to increase the level of perception among teachers rather than to support Microsoft's marketing strategy.

8.4 Facilitating Conditions

Providing technical and organizational support in fulfilling employees' tasks resulting from work activities is the obligation of every employer. Several initiatives, the implementation of which may lead to an increase in perception of Facilitating conditions, may encompass the provision of a helpdesk service or making available profiled instructional materials on the Internet. It is advisable to organize a training at basic, advanced, and specialized levels and provide training in the form of tutoring. Additionally, in situations demanding it, offering selected employees the possibility to undergo coaching sessions.

9. Limitations and Further Research

Technology acceptance is a concept that needs to be systematically determined. In the Authors' view, it requires three following steps:

- The basic software acceptance.
- The comparison of the software acceptance in the relevant groups.
- The comparison of the software acceptance with software intended for a similar purpose.

In this research, the first two steps were done. MS Teams was established as a well-accepted software and compared its acceptance in the two relevant groups (schoolteachers vs. academic teachers), finding no significant differences in acceptance but significant differences in perception where implications were explained in the previous sections. The third step concerning different software is our study's main limitation as we focus exclusively on Microsoft Teams. More work needs to be done on comparing software intended for a similar purpose (like Zoom or Google Classroom).

10. Conclusions

The Unified Theory of Acceptance and Use of Technology (UTAUT) model is found to be an effective explanatory model for the technology acceptance of e-learning software, specifically in the case of Microsoft Teams. The findings suggest that Performance expectancy, Effort expectancy, and Social influence are key determinants of teachers' intention to use Microsoft Teams in online education. There is no significant difference in technology acceptance between academic and schoolteachers, demonstrating the robustness of the UTAUT model. However, differences in perception of e-learning software characteristics between these two groups of teachers exist and are likely driven by their differing job requirements. To further improve technology acceptance, we propose the implementation of enhancements in the software that focus on facilitating conditions and teacher education and support. Teacher education and support refer to training and resources aimed at improving teachers' understanding and use of technology in the classroom. This may include workshops, online resources, and support from technology specialists.

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