E- Methodology toolbox: didactic methods for tutorial e-teaching on the example of students of a higher education institution in Austria

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Abstract

Methods are always used in a certain "social form", a form of interaction between tutor and student or between students among themselves. First, an overview of the social forms is given here. Then some methods are presented as examples. Some of them are likely to be well known from their own school and university days. The paper deals with the research of types of methods during the Covid-19 pandemic in e-teaching. The purpose of this study was to examine which method proved to be the most effective for achieving learning outcomes at the Franz Karl University in Graz. The research was conducted on a sample of 26 students in an online course in the period from March 1 to June 28, 2021/2021 of the academic year in the summer semester. An online survey was conducted in the survey. The research showed that the *Open Space, Brain writing, Interactive Mind map method*, and the *discussion method* proved to be the most effective for achieving the learning outcomes of the course but also maintaining social interaction among students and teachers, especially during the COVID-19 pandemic.

Keywords 1

E- methodology toollbox, e-teaching, higher education, tutorial, students

1. Introduction

Methods are ways to achieve a goal. The goal must first be established before the path to it (the method) is chosen. The method in the original (Greek) sense of the word means "way", i.e. by choosing a method away is sought to reach a given goal. The word "method" comes from ancient Greek and means something like "pursue" or "pursue" [12]. In general terms, a method is a systematic process to achieve a specific goal; If you want to climb a high mountain, you have to equip yourself appropriately, train, and collect the appropriate knowledge. In the context of science, the method is primarily to be understood epistemologically: If everything goes well, methods provide a more or less secure, but in any case transparent path to knowledge[2]. So the method is the way how or by what means knowledge was "gained" [7]. This helps to check where the research has gone, or possibly wrong turns, and how to go next. In order to be able to distinguish scientific arguments (i.e. reasons for evidence) from simple assertions - in addition to the material to be processed (texts, rocks, cells, or whatever) - the respective methods are of central importance [3]. With them, a statement X about an object or fact Y can be checked for plausibility insofar as they show how and under what circumstances this statement came about. Therefore, methods should never be used arbitrarily or uncritically [1]. Rather, it is important to reflect on their knowledge potential and perspectives with regard to the question and interest in knowledge [4]. It may also be necessary to rethink, modify or develop new methodological tools.

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Making a good choice of methods means finding the right "teaching-learning forms". They are “suitable” if they a) help to achieve the previously defined teaching-learning goals, b) are tailored to the selected content and c) can also be implemented under the given framework conditions. With the selected method tools, the focus is on practical feasibility [11]. The proposed concepts are intended as a useful addition to the lesson and are intended to inspire and motivate. With a reasonable amount of effort, new possibilities open up, for example for internal differentiation [6, 9]. The publication also shows methods that can be helpful in distance teaching [10]. The method case consists of a collection of tried and tested methods for the practical implementation of cooperative learning strategies. They are prepared in such a way that teachers can print them out and use them directly in the classroom. The individual methods and their sequence are explained, usually followed by some “practical tips”. Depending on the context of the lesson and the learning objectives, teachers can vary the methods themselves and adapt them to their specific needs.

Table 1
Methods Protocol

Method mediation to plan	Method carry out mediation	Planning methods	Methods of cognitive profit	Methods A - Z
Who teaches which methods, when and how?	A suggestion for the order	From what to how and when	Natural and human sciences methods	Methods in alphabetical strict order

(Source: [10].)

COVID-19 has fundamentally changed the way we live. The effects can be felt across Europe in all areas of life - work, leisure, travel, and education have not been spared. For months, schools, colleges, and universities had to close their doors during the lockdown, and online teaching became the new norm [8]. Education does not end at the school gates, however, and universities in Austria too. Teachers in all areas of education have done their utmost to ensure that their learners do not miss anything. From a legal perspective, distance learning means that the teacher and the learner are in different places and interact with one another. In this regard, the term is legally defined as the "imparting of knowledge and skills, in which the teacher and student are exclusively or predominantly spatially separated, and the teacher or his representative monitor the learning success ” [13]. This only applies to a limited extent to the lockdown situation in spring 2020; Even the term homeschooling, which is not allowed in Austria, or only allowed with a few exceptions, does not adequately characterize the situation. For the following explanations, the distinction between synchronous and asynchronous distance learning is important: Asynchronous distance learning occurs when the provision of tasks and materials and the actual learning process are temporally decoupled, e.g. through mail traffic or in the setting of learning materials on digital platforms; synchronous interactions, on the other hand, which include, for example, video chat or telephone calls, are not temporally decoupled. The new distance learning has received a remarkable amount of attention in the media [2]. In many cases, the focus was initially on questions relating to the implementation of the lessons from different perspectives (teachers, students, parents), which were initially also associated with hopes for action [7]. In addition, the question of the educational disadvantage associated with distance learning for certain groups of female students was discussed at an early stage [5]. The questions in this article are based on this report and the hoped-for opportunities and fears, the answers to which give the first empirical clues for the discussion, but also further questions and research desiderata [9]. What hopes and fears were associated with the new distance learning? As an effective hope of asynchronous distance learning, the more flexible design of learning in terms of time, in which the students are no longer subject to the rhythm of the school organization, was put forward. The first hope for an effect, which often only appeared indirectly in the media, lay in making learning more flexible, which was understood as part of a striving for increasing individualization [12]. Individualized teaching concepts have been seen in recent years as an answer to

the increasing heterogeneity of performance in school classes, which became even more important with the reform of numerous types of secondary schools and the intended decoupling of type of school and school-leaving certificate [2]. Individualized lessons, whose definition problems should not be in the foreground here, is characterized by different characteristics, an important feature of which is the lexicalization of learning in terms of time for faster and slower students. It is associated with both differences in the length of time they spend on the learning object and personal preferences in structuring the daily routine.

2. E-teaching during the corona pandemic from the aspect of e-tutorial

With the advancing digitization of society, a disadvantage that results from different approaches to digital media and a lack of skills in dealing with them is also being discussed today. It was precisely these problems that received special attention during the corona pandemic, and the question of "how much the current situation is exacerbating the social inequality of schoolchildren and families" was often discussed in connection with the new distance learning [8]. The question is currently being taken up politically by the highest authorities and discussed as to how central federal funds, with which the devices and necessary the hardware of the students and teachers are to be funded, can be used within the federal structure. The words "tutor" and "tutorial" have been around a long time. In fact, they seem to be an indispensable part of contemporary conversations about educational philosophy and pedagogy and fit nicely in all discussions of competency-based learning in the modern world of education. The first recorded use of the term "tutor" was at Oxford University in a document from Brasenose College, dated 1309, in which reference to students included the statement that "...the desires of their parents and the directions of their tutors" [11]. The Royal Commission of 1922 argued enthusiastically in favor of the Oxbridgetutorial method of education, i.e., Oxford and Cambridge, defending the accusation that this method was too expensive for the government to maintain by contending that the student "gets more teaching in return for his money," based on the presumption that one-on-one engagement between tutor and student elevated the quality of the time spent in interaction [6]. All teaching methods –lectures, group discussions, independent study –should ultimately have this as the goal. The role of the tutor in working with a student is to serve as a provocateur and responder to the student's insights and observations relative to the textual materials being considered in the encounter. The E-Tutorial is a creation of the Graduate Theological Foundation, an educational research institution involved in post-credentialing continuing education of professionals, and was first used in the descriptive literature of that institution's teaching philosophy published in 2010 [1]. The E-Tutorial relies solely upon e-mail as the transfer mechanism of the online student's response to the tutor's assigned textual materials. Using one-on-one interfacing communication via the internet, the student reads the assigned portion for each of the syllabi components, responds via email to the tutor who, in turn, critiques and comments upon the student's response and returns via email that communication to the student. Students are mid-career professionals completing their doctoral studies and the tutors are highly credentials scholars in their fields of research [12].

2.1. Method

N = 26 students participated in the research, of which 18 females, 8 males. The research was conducted during the summer semester of the online course in the period from March 1, 2021, to June 28, 2021. The online course in which students actively participated was *Diversity and Inclusion* at the Franz Karl University in Graz. Since online classes were held during the summer semester, the course was conducted exclusively in the real-time online system, every Monday from 9.00 to 10.00. The e-system had the possibility of recording live teaching as well as learning it by the course leader, as shown in Figure 1. Screenshot of Moodle courses *Diversity and Inclusion* (2020/2021).

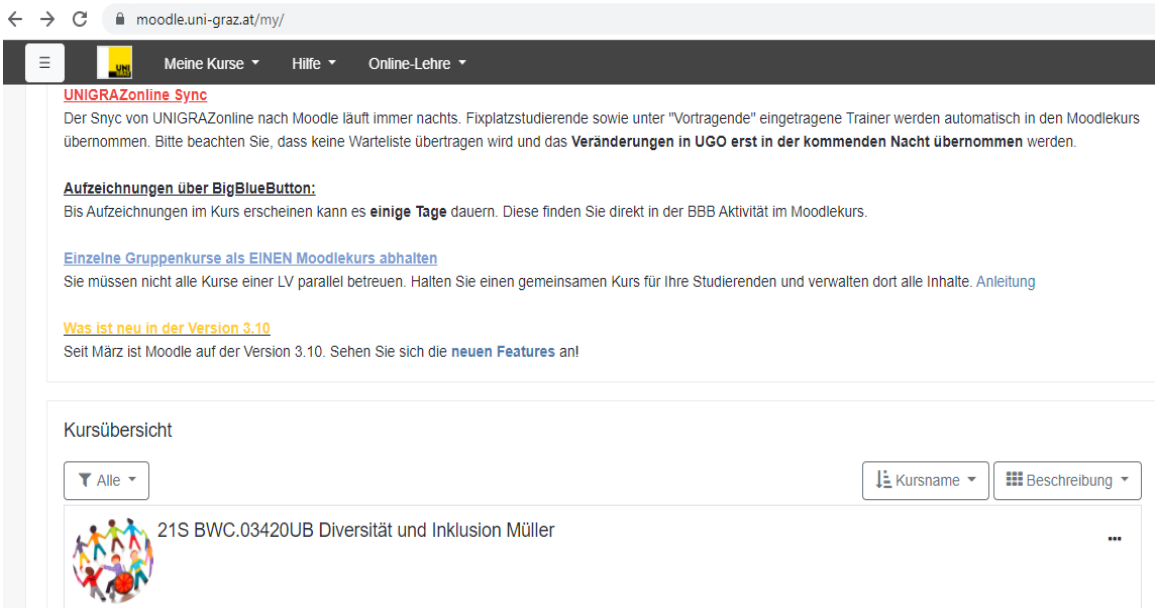


Figure: 1. Screenshot of Moodle courses *Diversity and Inclusion* (2020/2021)

An online questionnaire was conducted for the research instrument, which consisted of twenty questions. The first questions were related to general student information, sociodemographic data, gender. Then, most of the questions relate to the perception of students and expressing opinions about the different types of methods used during e-teaching, and questions about the effectiveness of the same methods. The data were processed in the SPPS program for statistics. The method of descriptive statistics, analysis of variance, hypotheses such as t-test testing and inferential statistics were used, where statistically significant differences but also correlations of individual variables were calculated using the Cramer coefficient. These social forms of E-teaching from method cases were inserted into the research: a) frontal teaching, lecture, b) plenary session, c) group work, d) partner work, e) individual work. Methods and e-tools for use in the e-tutorial have been added for the e-lessons: a) alarm clock, b) network exercise, c) triangle of commonalities triangle of commonalities, d) comparison of expectations, e) lively statistics, f) shock memory, g) PowerPoint karaoke, h) repetition stairs and methods for activating in between a) answer carousel, b) super expert, c) marble groups, g) moderation, Metaplan, h) one-minute paper, i) think-pair-share, j) snowballing, k) exercise machine, j) melee, as well as the methods for acquiring knowledge: a) plus and minus questions, b) luck pot, c) interactive mind map, d) interactive dialogue, e) map query, f) archeology congress, g) beehive, h) loudspeaker method, i) learning team coaching, j) sandwich, k) group puzzle / expert groups, l) learning pace duet, m) station learning/circuit training, and n) verbiage. Because, yes, this research required feedback from the students, this work and this research will only focus on the methods of acquiring knowledge. Here is the protocol for analyzing the meanings of methods of acquiring knowledge. Each student had the right to choose one of the offered methods from the box to present their seminar paper topic and to solve their assignments with the aim of the course outcome.

Table 2

Methods of acquiring knowledge analysis

a) Plus and minus questions	b) Lucky pot	c)Interactive mind map	d)Interactive dialogue	e) Card query	f)Archeology Congress	g) Beehive	h) Speaker method
Each student thinks of two questions, whereby he / she can	In a container there are pieces of paper	In order to find out ideas, opinions or previous	As the name suggests, with this method, knowledge is not	A board or pin board is provided with a suitable question or topic and	Groups of students receive a text that has been broken down into	The participants are divided into small groups for	This method starts after an initial input phase. The participants are given the task of writing down questions on the

answer one of the two [+ question], but not the other [- question].	with questions or terms and pieces of paper that are marked with "Glücksl os".	experiences on a topic from the students, the tutor writes a term in the middle of the board.	imparted in a frontal and monologizing manner, but rather is fed from the conversation with the students.	the students each receive an empty deck of cards. D.	individual short sentence sections and should put them back together	approx. 10 to 15 minutes (depending on the number of participants in small groups of three to six people) in order to discuss / solve a task.	topic and passing them on to specific people, so-called "loudspeakers"

(Source: [10].)

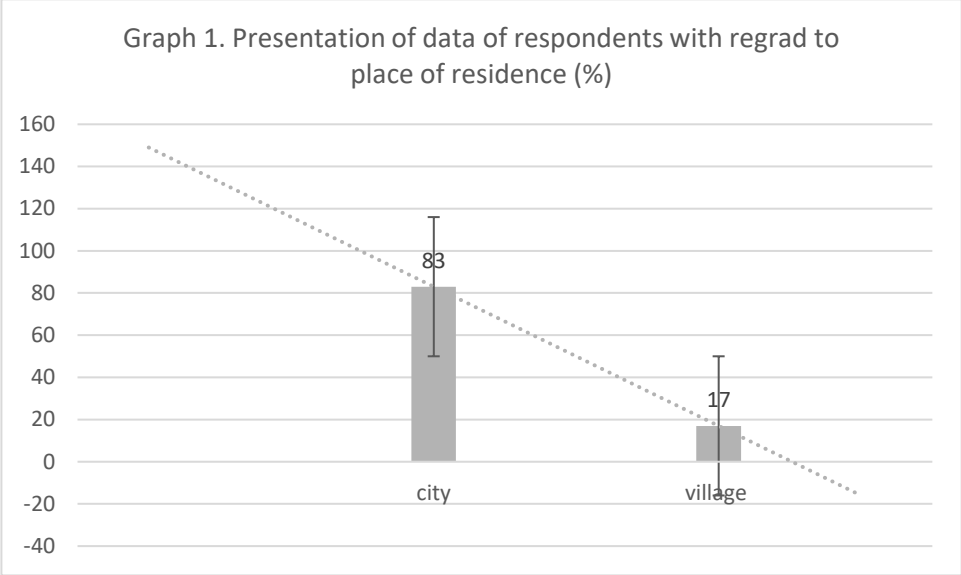
Table 2.1.
Methods of acquiring knowledge analysis

i)Card query	j)Archeology Congress	k)Beehive	l)Speaker method	m)Learning team coaching	n)sandwich	o)Group puzzle / expert groups	p)Learning tempo duet
A board or pin board is provided with a suitable question or topic and the students each receive an empty deck of cards	Groups of students receive a text that has been broken down into individual short sentence sections and should put them back together.	The participants are divided into small groups for approx. 10 to 15 minutes (depending on the number of participants in small groups of three to six people) in order to discuss / solve a task. J.	This method starts after an initial input phase. The participants are given the task of writing down questions on the topic and passing them on to specific people, so-called "loudspeakers"	A text brought by the tutor and tasks formulated for it are first processed individually by the participants.	The tutor gives a rough outline of the task and the participants are asked to think briefly about a solution or applicable methods	All participants are first divided into groups. Everyone receives two attributes, eg a letter (AE) and a number (1-5). These groups are called core groups (example: in core group "A" are the people with "A1", "A2", "A3", "A4" and "A5")	The students are given worksheets that they can work on at their own pace

(Source; [10].)

2.1.1. Results

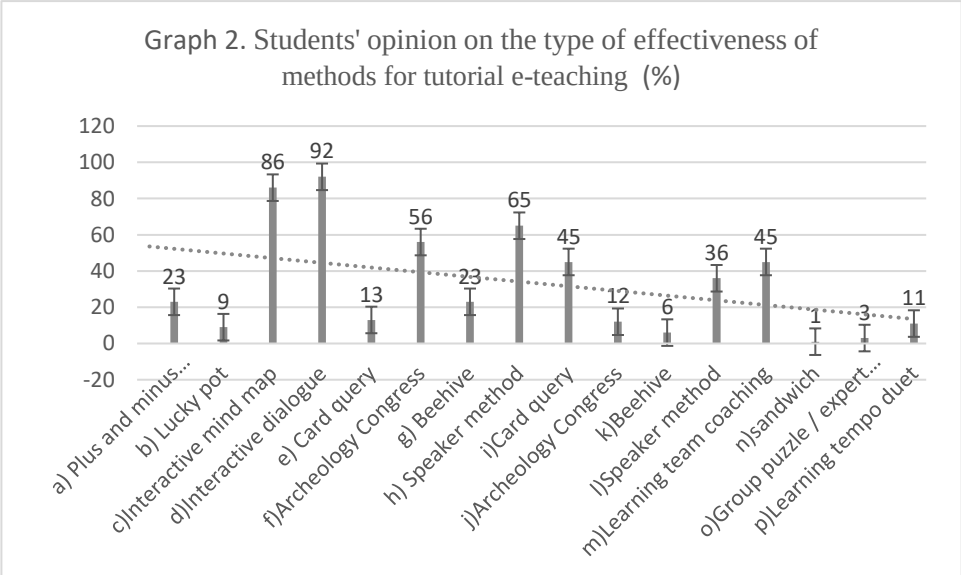
Graph 1. Presentation of data of respondents with regard to place of residence



(Source: Authors)

The Graph 1 show the presentation of responednts with regard to place of residence. There was in the resarch students from city place of residence (83%, SD=1.25, M02.51) and the students of village place of residence (17%, SD=1.45, M=1.25).

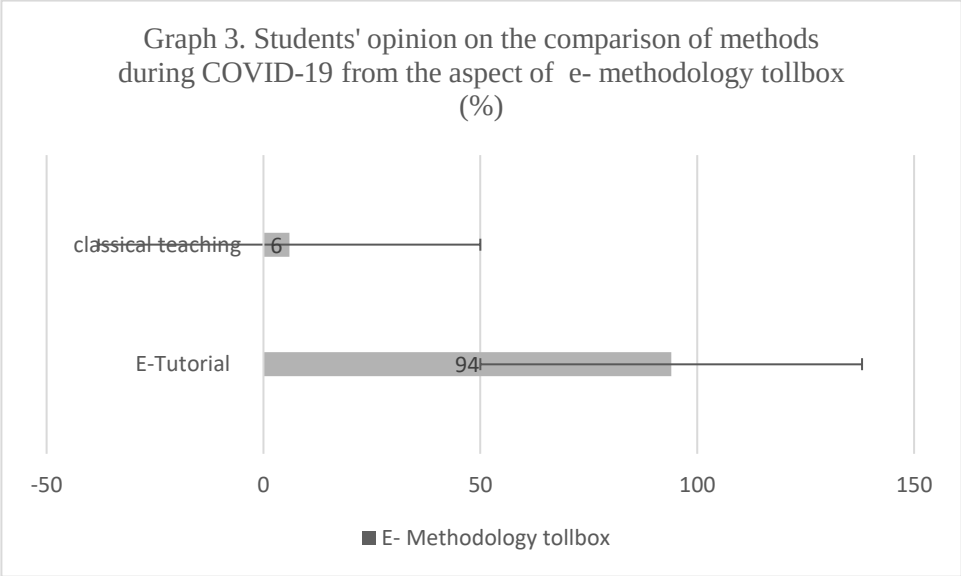
Graph 2. Students' opinion on the type of effectiveness of methods for tutorial e-teaching



(Source: Authors)

Students are mid-career professionals completing their doctoral studies and the tutors are highly credentials scholars in their fields of research. Students hold graduate degrees and the tutors must hold at least one doctorate and be significantly published in their tutorial field. This chart implicitly indicates the types of methods that students consider most effective during a pandemic. The research showed that the *Open Space (26%, SD=2.51, M=0.75), Brain writing (45%, DF=0.52, M=1,75), Interactive Mind map method (86%, SD=0,75, M=1,75),* and the *discussion method (94%, SD=2.45, M=2,15)* proved to be the most effective for achieving the learning outcomes of the course but also maintaining social interaction among students and teachers, especially during the COVID-19 pandemic.

Graph 3



(Source: Authors)

The interaction via e-mail between student and teacher dealingcritically with a relevant block of textual materials is quite intense owing to its one-on-one character. No group chats as the course is taught asynchronistically, allowing both student and tutor time for considered responses. The E-Tutorial, then, is essentially a revitalization of the traditional legacy of classical education inherent in the tutor, student, and textual tria. This chart implicitly indicates the types of methods that students consider most effective during a pandemic. It is the e-tutorial of 94 % (SD=1.75 M= 12,75) and only the variable classical teaching of 6 % (SD=0.75, M=1.85). Figure 2 shows an example of selecting a discussion method via the Padlet digital tool.

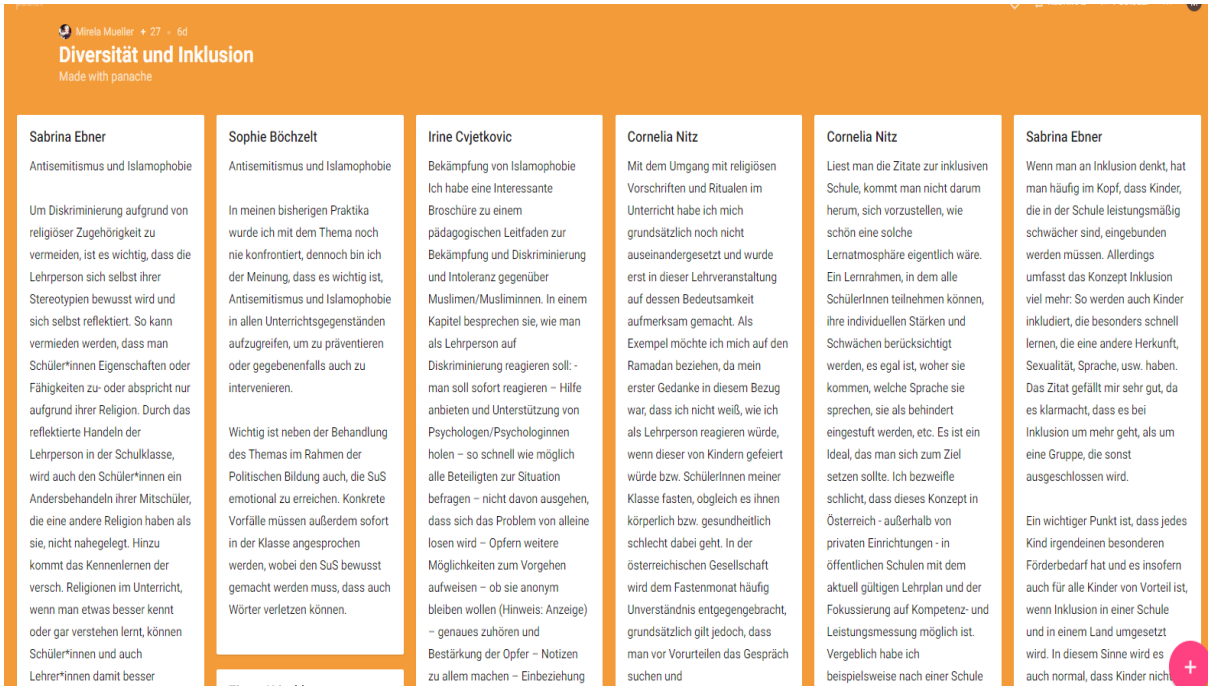


Figure 2 . An example of selecting a discussion method via the Padlet digital tool

Table 3

Relationship between students in the component of digital competence in terms of gender, in terms of the using the e-methodology toolbox

	Gender	E-methodology toolbox
Digital competeces	.121623	.323123

(Source: Authors)

As shown in Table 3, the calculated values of the correlation coefficient indicate little correlation between the acquired level of digital competence when using the modsystem (r = .12, p≤.05) as well as with the students regarding the acquisition of the level of digital competence (r = .05, p≤.05), while a relatively weak correlation was found between the level of digital competence and gender perimeter variable with using the e-methodology toolbox content (r = .32, ≤.05p).

Table 3

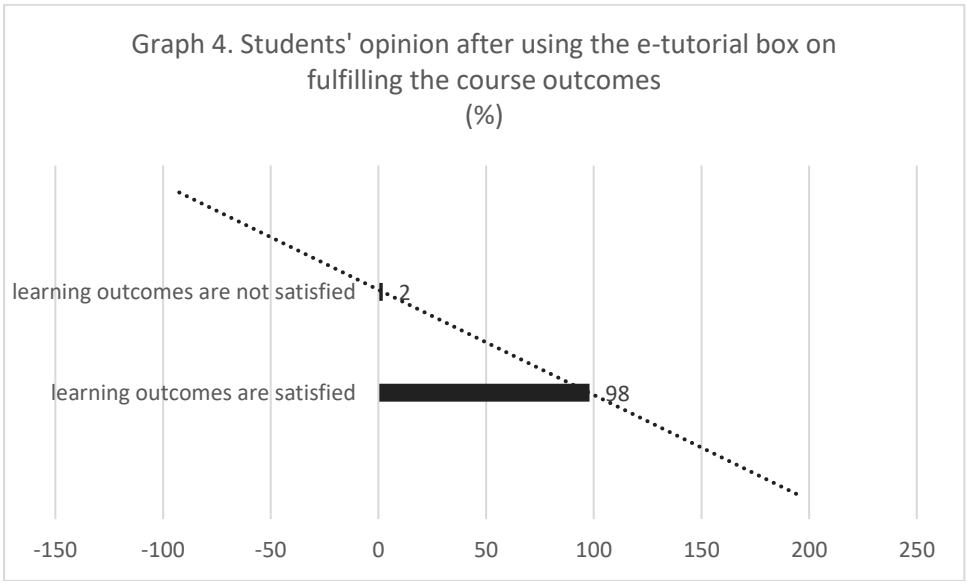
Two-factor analysis of variance (ANOVA) - the influence of factor-level of variable city with respect to the level of knowledge of the digital competence with respect to a properly formulated multimodal learning modiosystem.

	SS	df	MS	F	P-value
Level of linguistic competence	1465,15	1	12.52	245,565	3.251
a properly formulated multimodal learning modiosystem	1366,15	1	14.56	251,328	3.451

(Source: Authors)

As can be seen from the analysis of variance shown in Table 3, there is a statistically significant influence among students concerning the level of digital competence acquired regarding the correct using of the e-methodology toolbox with respect to properly didactically designed multimodal learning modes. According to the value, students who have acquired using the e-tutorials ($F(1,729) = 215{,}355$, $p \leq .0001$) and it can be concluded that there is statistical significance in the influence of the level factors of the acquired linguistic competence using the modiosystem.

Graph 4 Students' opinion after using the e-tutorial box on fulfilling the course outcomes



(Source: Authors)

The Graph 4. Show the results of students' opinion after using the e-tutorial box on fulfilling the course outcomes. The is only 2% (SD=1.45, M=2.54) of respondents who has a opinion that the learning outcomes are not satisfied after the using e-tutorial box on fulfilling the course outcomes and 98% (SD=1.25, M=2,89) think that the learning outcomes are satisfied. The E-Tutorial's effectiveness is proven every day and its longevity is assured owing to the demonstrable success of the classic and historic tutorial teaching model.

3. Conslusion

The tutorial and added the capabilities of interpersonal communication via the internet, and have produced the E-Tutorial for the 21st century, especially effective in the post-credentialed continuing education of practicing professionals. An online survey was conducted in the survey. The research showed that the *Open Space, Brain writing, Interactive Mind map method*, and the *discussion method* proved to be the most effective for achieving the learning outcomes of the course but also maintaining social interaction among students and teachers, especially during the COVID-19 pandemic. Research has shown that the following methods are most effective for achieving learning outcome goals: a) **Open Space** (feedback) see "Methods for Discussing Knowledge"; **Brain writing** (poster discussion adapted). A question or statement that has not yet been answered is written down on a poster / on the blackboard. Learners are asked to provide a comment, consent or to write down the refusal on the board / poster. One question could be, for example: "Should we look further into this topic, busy? " The

students mark a cross on a scale from“ no, I understand everything ” to“ yes, I need further explanation and practice ”. Additional open comments can also be requested. The tutor has an overview of the topics should be addressed again. This can also be done from halfway through a tutorial, in order to be able to address open questions directly in the meeting. Then **Interactive mind map**. In order to find out ideas, opinions or previous experiences on a topic from the students, the tutor writes a term in the middle of the board. By shouting, the students add the corresponding words, whereby an attunement to the topic takes place. Prior knowledge is called up and supplemented, and associative thinking is activated. The tutor can subsequently transfer missing content. In order to generate a visually visible increase in knowledge, it is recommended both at the beginning and to create a mind map at the end of the event and to compare it towards the end. Example question: "What do you think of about methods of biochemistry?" The last is the **Discussion with different applications.** The discussion of an issue in different variants is one of the standard tools for finding new knowledge content and formats by means of a specific question to treat. It is ideally suited for critically reviewing new information or questioning. A possible topic would be, for example, "What effects can prejudice and have stereotypes on intercultural communication? ” A flip chart, blackboard or whiteboard is sufficient to document the results. The optimal expenditure of time lies in this between 15 and 30 minutes. In the following, three variants of how a possible discussion can take place are presented. The E-Tutorial’s effectiveness is proven every day and its longevity is assured owing to the demonstrable success of the classic and historic tutorial teaching model.

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