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The Role of Emotions in the Context of Shaping the Attitudes of Academic Teachers Towards E-Learning

Abstract

The article attempts to identify emotions displayed by university teachers towards the adoption of e-learning solutions in the academic environment. The article is divided into four main parts. Part one is a description of one of the key components of human attitude, which is emotions. The second part describes the research methodology and defines the original research tool, which was used to measure the emotions manifested by academic staff in the use of e-learning. The third part is the analysis of the research results, which presents detailed summaries of each aspect of e-learning. The final section summarizes the research findings and makes recommendations for higher education institutions in the field of distance learning in an the academic community.

K e y w o r d s: e-learning, remote education, emotion, component attitude, university teacher

Introduction

For many years, emotions have been the object of interest of researchers, and many of them defined them as they saw fit (Howe & Krosnick, 2017). This is confirmed

by the fact that by the end of the 1980s more than 100 definitions had been created to define them (Michalczyk, 2017). The growing interest in the in-depth study of emotions and the attempt to properly explain them dates back to the 1990s (Albarracin, & Shavitt, 2018).

One of the leading contemporary definitions is presented in the *Dictionary of the Polish Language*. It defines emotion as "a strong feeling caused by a particular situation" (sjp.pwn.pl).

According to the *Cambridge Dictionary* we call emotions "a strong feeling such as love or anger, or strong feelings in general"(dictionary.cambridge.org).

According to the *Larousse Dictionary* emotions are „sudden trouble, transient agitation caused by an acute experience of fear, surprise, joy" (larousse.fr/dictionnaires).

Emotion has been defined as a "strong feeling such as love, fear, or anger; the part of a person's character that consists of feelings"(oxfordlearnersdictionaries.com).

According to *American Psychological Association (Dictionary of Psychology)* emotion is a "complex reaction pattern, involving experiential, behavioral, and physiological elements, by which an individual attempts to deal with a personally significant matter or event" (dictionary.apa.org).

Emotions can also be understood as "irruptive motivational complex in higher cognition" (Griffiths, 1997).

N.H. Frijda calls emotions processes of signalling that something important is happening from the point of view of an individual's well-being (Dąbrowski, 2012).

Emotions themselves are not easy to define unequivocally, which can be seen by analysing the literature devoted to them.

The proof can be found in the words of K. Oatley and J.M. Jenkins, who noticed that the indicated state consists of three factors that affect the very understanding of the term "emotions":

1. Emotion is the result of a conscious or unconscious assessment of an event and its evaluation as being key, having an impact on the subject's goals. Emotion is understood as positive when it favours the interest of an individual, and (by analogy) a negative emotion makes it difficult to achieve it.
2. The essence of emotion is readiness to act. The feeling of a given emotion can give priority to certain types of action by placing a certain sense of urgency on them. This means that emotion may interfere with the implementation of currently performed activities of a (predominantly) intellectual or behavioural nature. Alternative cognitive or functional processes can complement each other.

3. A particular emotion is usually experienced as a distinct type of mental state with which somatic changes, myths or reactions of a functional nature can interact (Pawłowska, 2013).

In attempting to explicate the concept of "emotion," attention may be drawn to an issue often equated with it, namely mood, although in reality they are two independent terms.

Both emotions and moods are affects, but the differences between them are crucial. Emotions are triggered by a specific event or a specific cause, their changes occur dynamically, and they are directed toward a specific goal. Moreover, they can be experienced for a very short time, which in the case of mood can last up to several weeks. An emotional response in a person can develop in parallel with the process of perception or recollection, follow it, or depend on the interpretation of the person feeling the emotion (Parkinson 1996).

Since in the case of mood both the purpose and its cause remain unknown, at the stage of theoretical analysis this element can be unequivocally excluded from our study.

The last of the distinguished elements included in the emotion-analytic component are feelings, which, as in the case of mood, are the subject of frequent comparisons to emotions.

Analyzing the literature on emotions, one can notice that they are much more complex states, related to human adaptation to life among others. Moreover, emotions, regardless of the region of the world, can be portrayed in the same way, while feelings are subject to much greater differentiation.

These differences clearly indicate that the complexity of emotions makes it impossible to analyze them reliably, and therefore they will not be studied.

The emotional component of human attitudes

The emotional component is one of the components that make up the full understanding of human's attitudes.

According to G. Allport, the affective (emotional) component of an attitude is directly related to the emotions manifested by an individual. One example of this is reacting strongly to a certain symbol (or specific words) that may be associated with childhood circumstances (Daft, Marcic, 2009).

The affective component is made up of a person's positive or negative emotions toward technology, for example, as in the above-mentioned dimension pleasant versus unpleasant (Svenningsson, Höst, Hultén, 2021).

It should be recognized that the "affective component" of attitudes has been operationally defined in two distinct ways. Both Ostrom (1969) and Kothandapani (1971) view the affective component as a differentiated response class composed of specific emotional responses (e.g., fear, respect).

According to G. Lantos, the above-mentioned component consists of emotions and feelings, as well as a person's mood (2010).

A similar interpretation is presented by W. Soborski, who uses this term to describe the system of feelings and emotions evoked by the object of an attitude. In his opinion, emotions may be positive or negative, with a zero value excluding the existence of an attitude (Soborski, 1987).

J. Strydom describes the emotional component equally accurately, noting that it mainly concerns emotions experienced by a person and they put pressure on his final decisions. This means that they perform both orientation (the task of which is to determine the value of the subject of the attitude) and motivational functions, which determine the behaviour of an individual (2005).

According to S. Nowak, the emotional component consists primarily of higher feelings – moral, aesthetic, religious or intellectual (1987).

In the opinion of M. Marody, this component includes people's emotions towards an object. These emotions have a specific direction and intensity. By direction, we mean a positive or negative attitude towards a given object. Intensity, in turn, tells us about the strength of the emotion that is triggered by a specific situation (1976).

I. Isterewicz believes, in turn, that the emotional component of an attitude "involves experiencing a positive or negative attitude towards the object of the attitude and the related response that stimulates an individual to a specific action" (1978).

Examining the above definitions, it can be noted that most of the authors mainly focus on emotions, feelings and mood.

Since in the case of mood, both the purpose and its cause remain unknown, this element was excluded from the authors' own research at the research stage.

Analysing the literature on feelings, it can be seen that they are much more complex states, related to the adaptation of a person to life among others. Moreover, emotions, regardless of the region of the world, may be presented in the same way, while feelings are subject to much more variation (Dąbrowski, 2012).

Finally, the affective component of attitudes may be particularly important as a direct motivator of behaviour (Peters, 2006). Not only do we appear to automatically classify incoming stimuli as good or bad but these positive and negative evaluations have been linked directly to behavioural predispositions (Bargh & Chartrand, 1999; Chen & Bargh, 1999).

These differences unequivocally indicate that the degree of complexity of feelings prevents them from being analysed reliably, and therefore they will not be investigated.

The organisation and conduct of the research

The research was conducted as part of the project of the National Centre for Research and Development, entitled "Uniform integrated program of the University of Rzeszów – the way to high-quality education" POWR. 03.05.00-00-Z050/17 in the academic year 2019/2020. One of the key tasks of the project was to raise the teaching and information competences of the academic staff of the University of Rzeszów in the field of creating e-learning courses and using them in the process of academic education.

The main purpose of this study was to determine the relationship of the emotional component of academic staff attitudes toward e-learning in higher education to the implementation of distance education training.

The choice of the topic was dictated by the scientific interests, as well as by the fact that in the mentioned scope there is a lack of research verifying the emotional component of attitudes towards the use of e-learning in academic circles and the direction of their changes as a result of participation in various forms of improvement.

Reviewing the research dedicated to the issue of the role of emotions in e-learning we can find some interesting positions.

The first one is by Carl Behnke and concerned the study of the relationship between students' emotional intelligence attitudes towards e-learning. Students were then directed to a computer-based lesson. Students' attitudes toward computer delivery were assessed using the Keller Instructional Materials Motivation Survey. As students' emotions increased, their attitudes toward computer instruction also increased. Students with positive emotional attitudes expressed significantly more positive attitudes toward teaching than those with a low average emotional component (Behnke, 2013).

The second study was conducted by Raafat George Saadé and Dennis Kira and concerned the role of emotions in e-learning. This study examines perceived ease of use and overall computer/internet experience as emotional factors that influence e-learning. The results suggest that the design of online learning systems should consider typical software interfaces so that students feel more comfortable using them (Saadé & Kira, 2009).

Very interesting research on the impact of emotions on e-learning in the context of students' fear of technology (technophobia) was conducted by F. Oluwalola.

The findings of the study show how technophobia can cause problems for students in distance e-learning. These students lack basic computer and technology skills and they are reluctant to learn how to use the new technology equipment or learning method. Their emotions toward computers and e-learning systems are negative, and problems with use cause even worse educational results. The negative cycle causes students to: lose interest in learning and seeking help. Key for these students would be good and fast technical support and tutors to help them move into positive thinking mode and therefore into a positive cycle that feeds the learning willingness and ability to cope better with obstacles (Oluwalola, 2015).

When it comes to literature analysis, let us briefly note that e-learning is commonly defined as the intentional use of ICT in teaching and learning (Najdu, 2003). In more general terms therefore, remote education encompasses teaching activities that essentially rely on e-learning technologies (Borba, Askar, Engelbrecht, Gadanidis, Llinares, Aguilar, 2016).

E-learning embedded specifically in the academic context has been divided into three key models, which are synchronous, asynchronous, and mixed learning.

As for academic universities in Poland, the so-called hybrid education, referred to in the literature as blended learning, is most often opted for, as it blends elements of traditional education with those of e-learning (Albiladi, Alshareef, 2019).

The research process was carried out in the first and last meetings with the respondents. The purpose of this procedure was to establish the initial attitude of academic teachers towards e-learning and to demonstrate the changes made as a result of the 30-hour course.

The argument supporting the choice of the research topic was the lack of research on the emotions felt in the context of the use of e-learning in the academic environment, and the direction of their changes as a result of participation in the improvement course.

A total of 429 university teachers from four Departments: Social Sciences, Humanities, Medical Sciences and Natural Sciences were pre-selected to participate. To make the study more reliable however, the study group was narrowed down via importance sampling to 320 respondents (80 faculty members per Department). Before the COVID 19 pandemic, respondents did not conduct classes using distance learning methods.

As a result of the random selection, the following stratified distribution of respondents was obtained, divided by the employment unit and gender (Table 1).

Table 1
List of respondents by unit/college as a result of stratified selection

Unit	Female	Male	Total
College of Social Sciences	48	32	80
College of Humanities	59	21	80
College of Life Sciences	57	23	80
College of Medical Sciences	45	35	80
Total	209	111	320

On the basis of the data, it can be noticed that the group of women surveyed is almost twice as large as the group of men, which is fully in line with the distribution of academic teachers at the University of Rzeszów.

The division of respondents by age and gender is equally important (Table 2).

Table 2
Age and gender distribution of the respondents

Age	Female	Male	Total
Up to 35 years (early adulthood)	35	20	55
36–55 years (middle adulthood)	148	73	221
55 years and above (late adulthood)	26	18	44
Total	209	111	320

The selection of respondents by age was determined on the basis of the developmental stages of an adult, proposed, among others, by R. Havighurst, D.L. Levinson and E.H. Erikson.

The respondents aged 36–55 (middle adulthood) constituted the largest research group. The smallest number of respondents, only 44, were over 55 years old (late adulthood), and there were 55 in the youngest group, not exceeding 35 years of age.

Research methods and tools

The research tool used was the c*ircular model of affect* by M. Yik. The circle consists of twelve segments, each of them placed on a clock face, with the following parameters: 3 – pleasure, 9 – dissatisfaction, 12 – activation, 6 – deactivation. Each of them was distinguished by an emotional state and an opposite state, which was placed in opposition to it (Szorc, 2012). The full specification is presented in Figure 1.

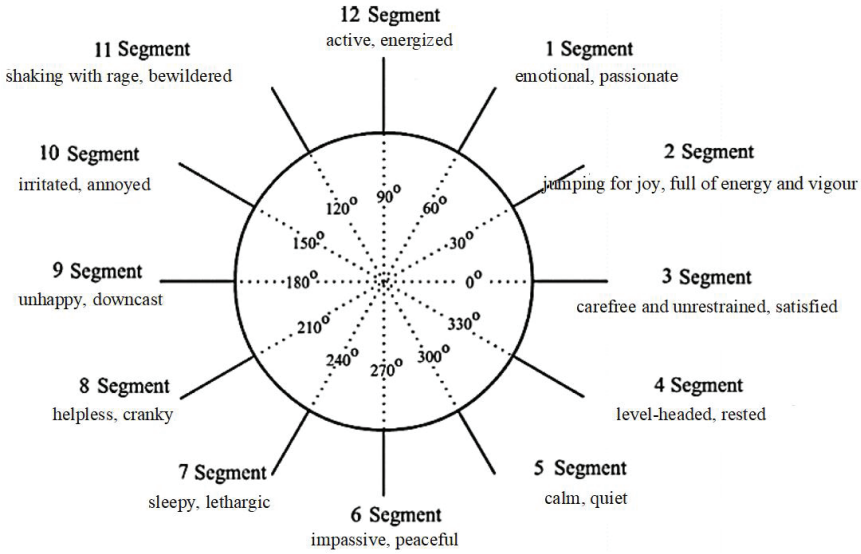


Figure 1. The circular model of affect according to M. Yik with added "basic" affects

On the basis of circular affect, emotional states can be classified according to two basic parameters:

– the extent of emotion, i.e. the level of activation of emotions (deactivation or activation),
– the hedonic tone of the emotions, i.e. the valence of the emotion (positive or negative)[1].

By dividing them by their size, six basic emotions can be distinguished with their opposition "counterparts" (Table 3).

[1] B. Basińska: *Emocje w miejscu pracy w zawodach podwyższonego ryzyka psychospołecznego* [Emotions in the workplace in professions of increased psychosocial risk], „Polskie Forum Psychologiczne" 2013, t. XVIII, nr 1, p. 89.

Table 3
Distribution of emotional states by valence (hedonic tone)

Negative emotions	Positive emotions
Unhappy	Satisfied
Helpless	Full of energy
Lethargic	Passionate
Furious	Calm
Annoyed	Level-headed
Impassive	Active

The implementation was carried out by establishing positive emotions on one side, through zero (indifference), and the opposite (negative) values (Basińska, 2013).

Analysis of research results

The emotional component was examined using a questionnaire developed on the basis of the *Semantic Differential Scale* with a bipolar scale with values ranging from −3 to 3 points (depending on the intensity of the experienced emotions: values −3 and 3 mean *high intensity*, −2 and 2 *moderate intensity*, −1 and 1 *low intensity*, and 0 *no emotions*, that is a neutral value).

The overall analysis of the research results concerned the determination of the results obtained before and after the implementation of a 30-hour course for academic teachers on the use of e-learning in the education process.

The change in the value of the emotional component of the attitude was calculated on the basis of the difference in indications of emotional states experienced by the respondents (in the initial and final tests).

The formula for changing the value of an emotion takes on the following form:

$$C_c = M_F + M_I$$

Change in value of the emotional component
C_c – change in the component level value, M_F – final measurement, M_I – initial measurement

Six pairs of opposing emotions were assigned to each of the highlighted e-learning scopes, and the respondents were asked to identify one in each of them with which they identified.

Table 4
General set of emotions experienced by respondents in the initial and final measurements

Mean of the initial measurement	Mean of the final measurement	Change in the value of emotions (valence)	Significance level (p)
−0.78	0.96	1.74	0.000

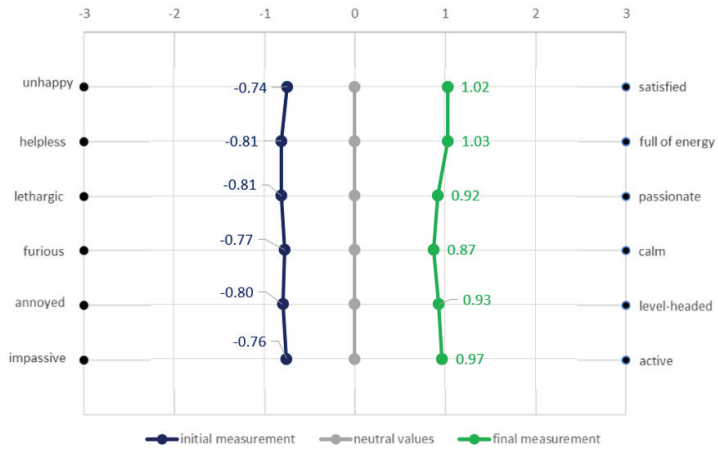
On the basis of the obtained arithmetic means of experienced emotions, it can be concluded that before the training, academic teachers experienced moderate negative emotions (−0.78 points) (Table 4). During the course of the training, they gradually became convinced to use an alternative form of education, as evidenced by the results of the final measurement. Participation in a 30-hour training course changed the valence of emotions into positive ones, with a greater intensity than the initial measurement (0.96 points).

The calculated coefficient of statistical significance level $p = 0.000$ gives an indication of the relationship between the implementation of e-learning training and the emotions experienced.

The calculated median value for the results of the initial test is −1 point (low-intensity negative emotions), and for the final test it is 1 point (low-intensity positive emotions).

Based on the graphical presentation of the results (Graph 1), a detailed analysis can be made to show the emotions experienced by the respondents. A scale containing six pairs of opposing emotions indicates that *fury, annoyance*, and *helplessness* were experienced most strongly in the initial test. The low level of knowledge and skills of the respondents could be the reason for the respondents' indications. During the first classes, an overwhelming number of teachers were reluctant to perform subsequent tasks and they showed apprehension resulting from meeting the new educational situation.

As a result of the training, the valence of emotions has changed towards positive values, regardless of the pair. Among the respondents the most experienced were: *satisfaction* and *full energy* to use e-learning courses in their own activities.



Graph 1. General characteristics of the emotions experienced

Table 5
Set of emotions experienced by respondents in the initial and final measurements in terms of sex

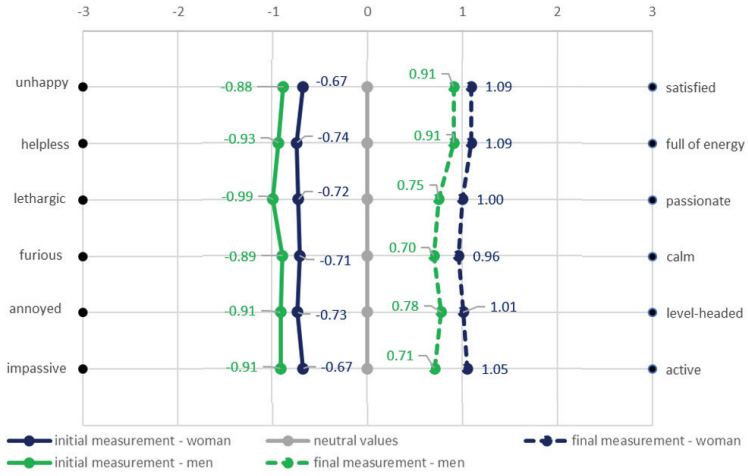
Sex	Mean of the initial measurement	Mean of the final measurement	Change in the value of emotions (valence)	Significance level (*p*)
Female	−0.71	1.03	1.74	0.000
Male	−0.92	0.79	1.71	0.002
Mean	−0.81	0.91	1.73	0.001

The grey colour shows the highest increase in the emotional component

The analysis of the results by sex shows significant differences in the context of emotions experienced with regard to e-learning before and after the training (Table 5). Both women and men changed their valence from negative to positive. This is confirmed by the significance factor *p*, which indicated a value below 0.05. The initial measurement showed that women's negative emotions were more moderate and tended towards neutral values. In the case of men, there was more pronounced apprehension manifested in the reluctance to implement the training, the taught content of which was argued to be of low usefulness and felt to be a waste of time.

The final study indicated higher emotional intensity in women, manifested in positive values, while men were much more balanced in the context of emotions indicated in the questionnaire. The higher level of knowledge obtained as a result of the training and the willingness to participate in the classes could be related to the obtained results. The change in emotions in men was less pronounced, but also indicated a positive valence.

To sum up, a link between sex and the emotions experienced as a result of the training can be confirmed.



Graph 2. General characteristics of the emotions experienced (sex of the respondents).

The graphical interpretation of the emotions experienced by women and men (Graph 2) shows that in the initial measurement, the respondents indicated very similar values within individual pairs of emotions, which testify to the uniform structure of the emotional component of the attitude. The respondents consistently indicated emotions of the same intensity, but in the case of women, the values were shifted by 0.2 points towards neutral emotions. The final measurement showed that for both sexes the highest intensity was *satisfaction*, while the most divergent results concerned the emotion of *passion*, which prevailed in women.

On the basis of the tabulated set of results in terms of age, it can be shown that as a result of the training, there was a significant change in the emotions experienced for each group of respondents, as evidenced by the calculated *p*-factor, which indicates a value not exceeding 0.05.

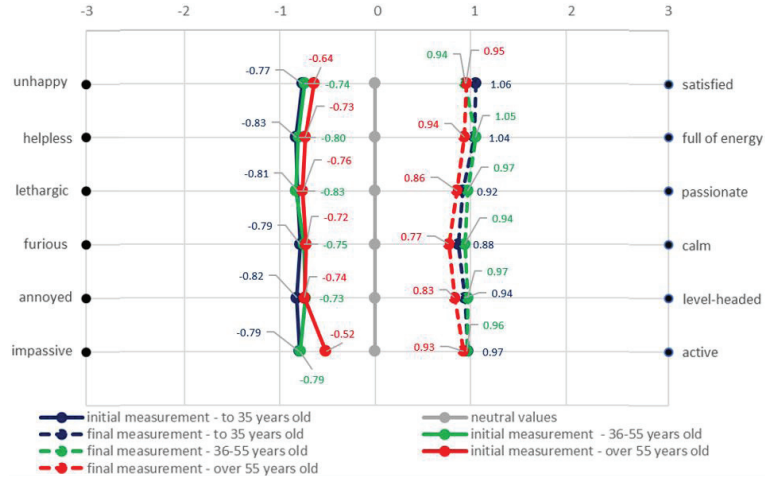
The highest change in values, and at the same time their greatest intensity, was observed in the group of the youngest respondents (up to 35 years of age). The key turned out to be high information and communication competences and those resulting from the use of e-learning technologies in professional and private life. During the training sessions, the youngest respondents easily performed the next steps of the exercises, which could be related to the positive emotions manifested during the classes. Respondents aged 36–55 experienced very similar values compared to the youngest respondents (Table 6).

Table 6
General set of emotions experienced by respondents in the initial and final measurements by age

Age	Mean of the initial measurement	Mean of the final measurement	Change in the value of emotions (valence)	Significance level (*p*)
Up to 35 years	−0.80	0.97	1.77	0.000
36–55 years	−0.77	0.97	1.75	0.001
Over 55 years	−0.69	0.88	1.57	0.003
Mean	−0.75	0.94	1.70	0.002

The grey colour shows the highest increase in the emotional component

Emotional states indicated by the oldest respondents underwent the smallest changes, and in the final measurement they indicated values most similar to neutrality, which could be related to great difficulties in the context of performing some of the tasks. Summing up the considerations regarding the comparison of the emotions experienced by the age of the respondents, the aforementioned relationship should be firmly confirmed.



Graph 3. General characteristics of the emotions experienced (age of respondents)

The graphical presentation of the results shows a detailed distribution of individual emotions for each of the age groups studied (Graph 3). The analysis of the answers in the initial and final tests shows that the respondents from a given group

indicated values of similar intensity in particular pairs of emotions, which proves the uniform structure of the cognitive component and the lack of ambivalence of the experienced emotions. In the initial measurement, the emotional states of the highest intensity in each of the studied groups were *annoyance, fury* and *helplessness*, which can be explained by them meeting a new situation, as well as (in most cases) lack of knowledge in the field of e-learning. The final measurement was dominated by *satisfaction*, being *active* and the *full of energy* option. A significant increase in knowledge in each of the studied groups may have been linked to the emotions with a positive valence displayed.

Table 7
General set of emotions experienced by respondents in the initial and final measurements by unit of employment

College of Sciences	Mean of the initial measurement	Mean of the final measurement	Change in the value of emotions (valence)	Significance level (*p*)
Medical	−0.93	0.18	1.11	0.008
Social	−0.86	1.64	2.51	0.000
Humanities	−0.71	0.79	1.50	0.003
Life	−0.58	0.88	1.46	0.003
Mean	−0.77	0.78	1.55	0.004

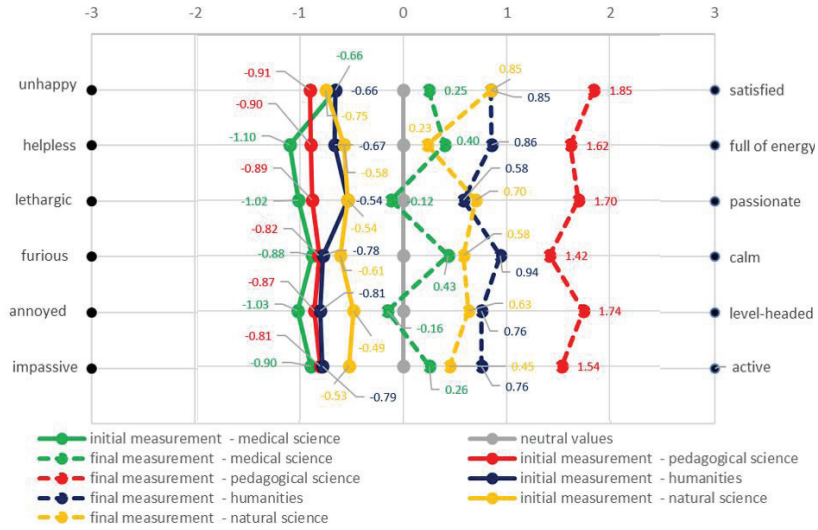
The grey colour shows the highest increase in the emotional component

The analysis of the respondents' answers with regard to the employment unit shows a high differentiation of the emotions experienced as a result of the training (Table 7). This is confirmed by the calculated value of the *p* significance coefficient, which, irrespective of the group under study, shows a value below 0.05.

The initial measurement showed that the employees of each of the units displayed negative emotions, and the highest levels of their intensity were observed in the respondents of the College of Medical Sciences. This group's emotional valence could be closely related to the apprehension observed during the training and the lack of intrinsic motivation to use a complementary form of education. Many of the respondents indicated that there was no point in improving in this area due to the specific nature of their profession. The employees of the College of Life Sciences were the closest to the neutral values of the perceived emotions, and their result can be explained by the use of e-learning technologies in their research and teaching work.

The final measurement showed a much greater differentiation in the context of experienced emotions, while the most extreme values were characteristic of the responses of the employees of the College of Medical Sciences and the College of

Social Sciences. The first of the groups presented in the final test indicated values similar to the lack of feeling any emotions (neutral values), which may have been linked to the difficulty of understanding e-learning as a form of teaching. The lack of an evident perspective in this regard was confirmed by the smallest change in the direction and value of the experienced emotions. In the final measurement, the employees of the College of Social Sciences indicated high values of positive emotions (1.64 points), which may be related to their increased attention and internal motivation to use e-learning. The obtained value indicates the consistency of the components of the attitudes of teachers representing social sciences, who also obtained the highest results in the knowledge test (a high value of the level of the cognitive component was concurrent with the perception of positive emotions).



Graph 4. General characteristics of emotions experienced by respondents (respondents' unit of employment)

The graphical interpretation in the context of the employment unit (Graph 4) indicates high differentiation in the perception of individual emotions. The ambivalence manifested in the responses of the employees of the College of Medical Sciences demonstrated the high efficiency in the use of e-learning technologies, with a simultaneous lack of their connection with the implementation of their own didactic classes. Confirmation of the feeling of various emotions is shown in the indication of the value *full of energy* with a simultaneous *lack of passion* (understood as the enthusiasm to work in this area).

Summing up, it should be pointed out that the implementation of the training of the academic staff of the University of Rzeszów in the use of a complementary form of education brought results in the form of a change of direction and the value of the emotions manifested (from negative to positive). The division of the respondents according to the intermediary variables showed a strong correlation between the changes in the value of emotions and the level of knowledge (cognitive component). The highest values, analogous to the cognitive component, were obtained by women, people under 35 years of age and respondents from the College of Social Sciences. The obtained results indicate a strong correlation between the level of the components of the attitudes of academic teachers, which is an important conclusion of the conducted research. Similarly, the lowest emotional intensity was observed in men, people over 55 years of age and employees of the College of Medical Sciences

Detailed analysis of the research results

The scope of issues which the respondents were asked about included the five main pillars of the supplementary form of education, divided on the basis of theoretical assumptions of our own research concerning the use of e-learning technologies in the academic environment.

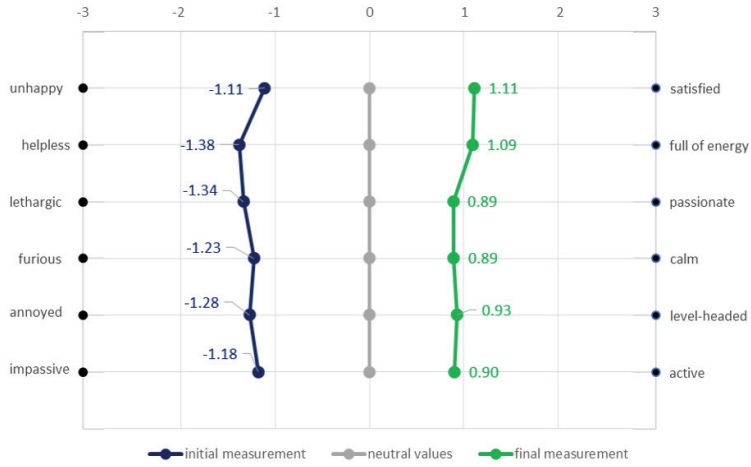
Among them, the following components are distinguished:

– *implementation of the education process,*
– *communication with students*
– *scientific development*,
– *acquisition of educational content,*
– *management of the education process.*

The first pillar of the complementary form of education was the *implementation of the education process through e-learning technologies.*

The respondents' task was to indicate on a bipolar scale the emotions they are currently experiencing in relation to the proposed implementation of didactic activities via e-learning (Graph 5).

The initial test indicated that, regardless of the pair of opposing emotions, the respondents experienced only the negative ones. The negative valence of emotions with moderate intensity (down to −1.38 points) suggests a clear tendency to avoid conducting classes with the use of e-learning technologies. The most evident emotional state was *helplessnes*s, which resulted from the lack of knowledge and skills necessary in the process of on-line education.

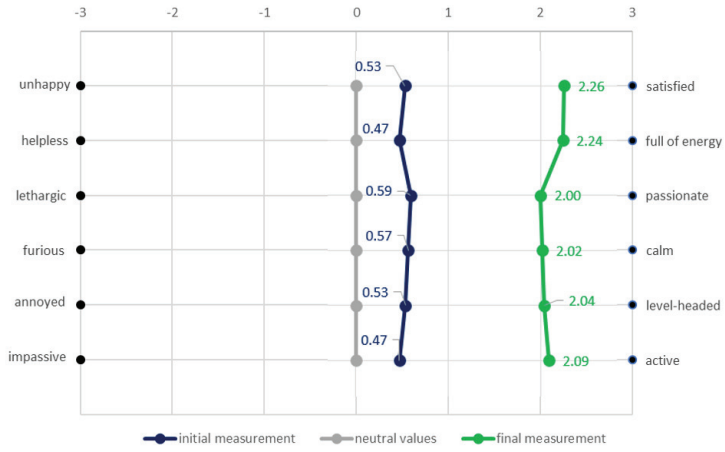


Graph 5. General characteristics of emotions experienced in the context of the implementation of the education process through e-learning technologies

The final measurement showed a clear improvement in the emotions experienced by the respondents. The averaged results are characterised by a lower emotional intensity (to 1.11 points), but their valence (regardless of the pair) changed to a positive value. The improvement could have been due to them getting to know an alternative form of conducting classes that was new to them, in terms of its theoretical aspects (by most of the respondents), as well as the creation and administration of an e-learning course. The academic teachers, getting acquainted with the subject of the training, while performing subsequent tasks, gradually became convinced to conduct classes using e-learning technologies, thus changing the valence of the emotions they experienced.

The second pillar of the complementary form was *communication with students through e-learning technologies*. The respondents' task was to indicate their emotions towards the proposal to contact students via such tools as chat, forum or videoconference (Graph 6).

The analysis of the initial measurement results shows that emotions with a positive valence and low intensity (up to 0.59 points) are clearly displayed. The high optimism, especially among the young educators, could be due to the fact that in their didactic work they use the possibility of communicating with students via e-mail, chat or other instant messaging. The vast majority of the respondents are skilled in this respect, and therefore they would not have a problem with using this form of communication as the main one. The low intensity of positive emotions may, in turn, result from the lack of knowledge of the specific tools that were presented during the training.



Graph 6. General characteristics of emotions experienced in the context of communication via e-learning technologies

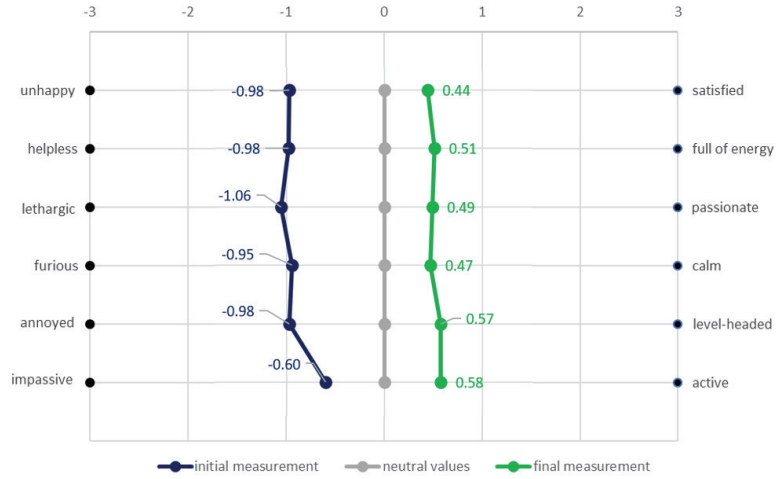
The final measurement of emotions showed an increase in their intensity compared to the initial one by 2 points (to 2.26 points for satisfaction). The reason for such a high intensity may be the combination of the declared initial optimism and partial knowledge with the information that the respondents completed as a result of the implementation of the course. Academic teachers, learning about new communication tools using e-learning technologies, responded to the proposal to implement them in the education process primarily with *activeness, full energy* and *satisfaction*.

The third pillar of the complementary form of education was *scientific development through e-learning technologies*. Respondents indicated the emotions experienced in relation to the proposals for the implementation of articles and other scientific works with the use of professional tools for working in the cloud, i.e. *Google Documents, Office 365*, and the use of scientific databases, i.e. *Cejsh* or *POL-index* (Graph 7).

Based on the analysis of emotions manifested by respondents, it can be noticed that as a result of the training, both the valence (from negative to positive) and the emotional intensity (from moderate to low) changed.

The analysis of the initial measurement showed a negative valence of low-intensity emotion (reaching: −1.06 points). Negative values may have resulted from the fact that the vast majority of academic teachers did not use *cloud-based tools* in their didactic work through which a joint research project (or scientific article) could be carried out with several people in real time. Limiting oneself to research work only in the so-called *offline* mode translates directly into negative emotions

indicated by respondents, such as *lethargy* or *annoyance*. The vast majority of respondents during the training indicated that there was no need to use tools supporting scientific development.



Graph 7. General characteristics of emotions experienced in the context of scientific development through e-learning technologies

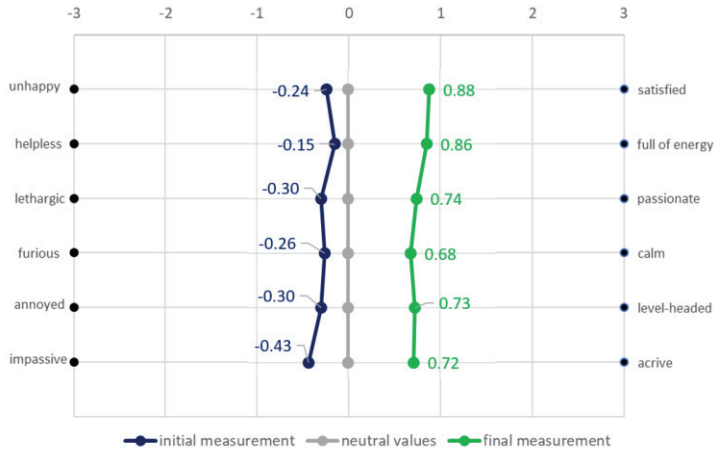
The final measurement showed that both the valence and the intensity of the emotions had changed significantly. Regardless of the pair of opposing emotional states, they changed valence to positive with a very low intensity close to neutral values (indifference). This could have been due to increased knowledge that excluded the feeling of negative emotions while at the same time there was no internal need to use it in the context of scientific self-development. Many academic teachers confirmed an increase in knowledge in this field in the final measurement, but they did not plan to use it in practice in the future.

The fourth pillar of the complementary form of education was the *acquisition of educational content through e-learning technologies* (Graph 8). Respondents indicated their emotions towards the offer of obtaining didactic materials through professional educational websites.

The analysis of the emotions experienced by the respondents indicates the valence and intensity of the emotions they experienced.

The initial measurement showed that the respondents displayed very low intensity of negative emotions (in the range from −0.43 to −0.15 points depending on the pair of opposite emotional states). The respondents' indications of indifferent attitudes to the studied issue may be due to a lack of knowledge about the

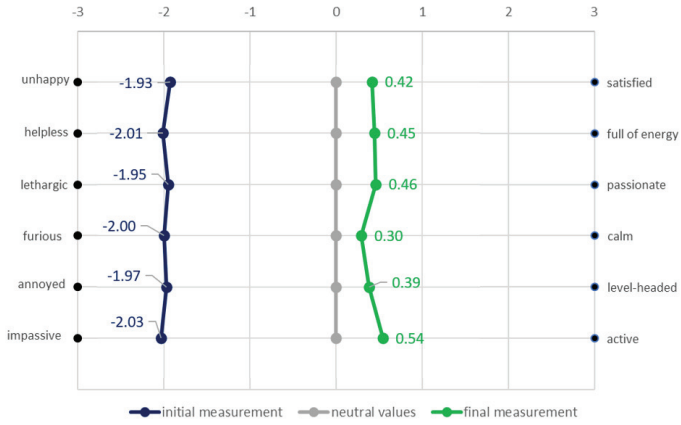
functionality of educational portals and the possibility of using them. Many of the respondents have not before used services such as *Google Scholar* enabling access to a database of thousands of scientific articles or a scientific social networking site such as *ResearchGate*, which allows scientists to exchange experience. The negative valence of emotions may be caused by concerns about the difficulties in using the software discussed during the training.



Graph 8. General characteristics of emotions experienced in the context of acquiring educational content through e-learning technologies

The final measurement of the emotions experienced by the respondents showed a change in their valence to positive, with a low intensity (up to 0.88 points). The improvement may have resulted from the increased knowledge of the use of educational portals (cognitive component). Many teachers were optimistic about their willingness to use them in the preparation of teaching materials for their classes. The highest value of *satisfaction* and *passion* confirms the positive attitude of the teachers subjected to the research. As a result of the training, many of the respondents decided to use educational platforms such as *ScienceDirect* or *ResearchGate* in the future. According to the respondents, supplementing the content of education will increase the quality of the issues they teach.

The fifth pillar of the complementary form of education was the *management of the education process through e-learning technologies*. The task of the respondents was to indicate the emotions experienced in relation to the proposal to administer the education process via the e-learning platform, among others by posting an e-course, assigning students and monitoring their learning achievements (Graph 9).



Graph 9. General characteristics of emotions experienced in the context of managing the education process through e-learning technologies

The initial measurement indicated the highest negative emotional intensity. A possible cause of the apparent reluctance was a lack of knowledge in the administration of e-learning technologies in the process of educating students and the clear avoidance of action in this area (linking the cognitive and behavioural components). High intensity is particularly evident in the case of such emotions as *helplessness* (−2.01 points) and *fury* (−2.00 points). Academic teachers had not previously used e-learning platforms such as WBTServer or Moodle in their didactic work, therefore they indicated considerable concerns in the context of their use in their own classes.

As a result of the training, the valence of emotions changed (to positive) with a very low intensity (0.3–0.5 points). The change in the valence of emotions could have been caused by an increase in knowledge of the use of e-learning platforms. At the stage of learning about new *WBTServer* functionalities, such as: *placing a course on the platform, assigning participants (students) and testing their educational achievements*, the teachers gradually changed their attitudes from negative values, through a neutral state to positive ones. The low intensity could have resulted from the fear of using e-learning platforms instead of traditional education. Conducting classes remotely is associated with a lot of responsibility, therefore the respondents approached this topic with a certain degree of caution.

Summary

On the basis of the research analysis, it was determined that the teachers in the initial measurement showed negative emotions of low intensity (−0.74 points), and the final measurement showed that the emotions changed their valence towards positive emotions of low intensity (0.96 points). The difference in the value of emotions on the scale ranging from −3 to 3 points was 1.74 points.

A detailed analysis of each of the five ranges examined showed large discrepancies in the context of the obtained results.

The first of the main pillars was related to the implementation of the education process through e-learning technologies. The initial measurement showed that, regardless of the opposing pairs, the respondents indicated only negative emotions of moderate intensity. *Helplessness* was experienced the most (−1.38 points), which could result from the lack of adequate knowledge of the respondents in this area. The final measurement showed that each of the six pairs was characterised by positive emotions of low intensity, among which the highest value was obtained by *satisfaction* (1.11 points).

The second pillar of the use of e-learning technologies concerned communication with students. The respondents, in both the initial and final measurements, showed emotions with a positive valence. In the case of the initial questionnaire, they obtained low values (for example*, satisfaction*: 0.53 points), while the final measurement of emotions showed a high intensity (e.g. *full energy*: 2.24 points), which could have been related to the experience that was reinforced with the knowledge gained during the course.

The third thematic scope of the research carried out concerned the support of scientific development through e-learning technologies. The initial measurement showed that the respondents experienced low-intensity negative emotions (in the range from −1.06 to −0.60 points). As a result of the course, the valence of emotions changed in a positive direction, but with a similar intensity (e.g. 0.57 points for being *level-headed* and 0.51 points obtained for being *passionate*).

The fourth pillar of the use of e-learning technologies was the acquisition of educational content. The respondents indicated the feeling of a very low level of negative emotions (the highest value was for being *impassive*: −0.43 points). The final measurement of emotion showed a change of direction to positive with a similar low intensity (e.g. 0.73 points for being *level-headed*).

The analysis of the final pillar concerned the management of the educational process through e-learning technologies. The respondents' indications were limited only to negative emotions of the highest intensity, reaching values exceeding −2.00 points. (e.g. for *helplessness* or fury). The final measurement showed that there

was a change in the experienced emotions towards positive emotions of very low intensity, close to the neutral values (e.g. 0.42 points for *satisfaction* or 0.39 points for being *level-headed*).

Statistical analysis relating the results to intermediary variables showed that sex, age and the unit of employment were linked to the emotions experienced.

Discussion and conclusions

Based on the results of the study, several conclusions should be drawn. The task of universities is to establish distance-learning centers that will offer technical and substantive support to university teachers in the area of remote education. Such centers should provide conditions for conducting classes via e-learning technologies and hold periodic trainings so that academic personnel would stay up-to-date with the novel forms of education that emerge.

Meanwhile, university teachers should take care of continuous self-improvement. It is in lecturers' best interest to update their knowledge using various e-learning tools, as being aware of the importance of lifelong learning in a rapidly evolving society is something that cannot be done without. University teachers should also use their extensive experience gained over the years in traditional education and possibly pour some of that wisdom over to remote education. In an information, technology-driven society such as ours, this is in fact the only viable attitude that can guarantee smooth communication between teachers and students and help avoid digital exclusion, a problem particularly pressing for those whose long-proven teaching methods are no longer relevant yet are still practiced by some of the faculty members.

The key challenge of academics is mainly the use of academic databases with international reach i.e. CEON, Google Scholar or ResearchGate. It is important that the use of the above-mentioned databases should be realized not only by studying available articles, but also by uploading own publications. Scientific development is one of the most important components of not being digitally excluded and opening new educational horizons. This fact is an unquestionable benefit for teachers (increased competence) and universities (increased quality of education).

Equally important is the use of social networking sites dedicated to scientists from all over the world (e.g. Academia.Edu or Linkedin). The exchange of valuable experiences, broadening of horizons and possibility of international cooperation are very important aspects increasing the quality of e-learning education.

The last recommendation concerns the administration of the e-learning process, which received the lowest scores in the research. One of the ways to counteract the negative emotions resulting from poor experience in this field are specialized courses that prepare academic staff for their widespread use.

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Krystian Tuczyński

Rola emocji w kontekście kształtowania postaw nauczycieli akademickich wobec e-learningu

Streszczenie

W artykule podjęto próbę identyfikacji emocji, jakie przejawiają nauczyciele akademiccy wobec przyjęcia rozwiązań e-learningowych w środowisku akademickim. Artykuł podzielony jest na cztery główne części. Część pierwsza to opis jednego z kluczowych komponentów postawy czło-

wieka, jakim są emocje. W części drugiej opisano metodologię badań oraz zdefiniowano oryginalne narzędzie badawcze, które posłużyło do pomiaru emocji przejawianych przez nauczycieli akademickich w związku z korzystaniem z e-learningu. Trzecia część to analiza wyników badań, która przedstawia szczegółowe podsumowania każdego z aspektów e-learningu. W ostatniej części podsumowano wyniki badań i sformułowano zalecenia dla instytucji szkolnictwa wyższego w zakresie kształcenia na odległość.

S ł o w a k l u c z o w e: e-learning, kształcenie zdalne, emocje, postawa komponentowa, nauczyciel akademicki

Кристиан Тучиньски

Роль эмоций в контексте формирования отношения академических преподавателей к электронному обучению

А н н о т а ц и я

В статье предпринята попытка определить эмоции, проявляемые академическим персоналом по отношению к внедрению решений электронного обучения в академической среде. Статья разделена на четыре основные части. Первая часть представляет собой описание одного из ключевых компонентов человеческого отношения, которым являются эмоции. Во второй части описывается методология исследования и определяется оригинальный инструмент исследования, который был использован для измерения эмоций, проявляемых преподавателями в связи с использованием электронного обучения. Третья часть - анализ результатов исследования, в котором представлены подробные резюме по каждому аспекту электронного обучения. В заключительном разделе подводятся итоги исследования и даются рекомендации для высших учебных заведений по дистанционному обучению.

К л ю ч е в ы е с л о в а: электронное обучение, дистанционное обучение, эмоции, компонентное отношение, преподаватель университета

Krystian Tuczyński

El papel de las emociones en el contexto de la formación de las actitudes de los profesores universitarios hacia el e-learning

R e s u m e n

El artículo trata de identificar las emociones mostradas por el personal académico hacia la adopción de soluciones de e-learning en el entorno académico. El artículo se divide en cuatro partes principales. La primera parte es una descripción de uno de los componentes clave de la actitud humana, que son las emociones. En la segunda parte se describe la metodología de la investigación

y se define el instrumento de investigación original, que se utilizó para medir las emociones manifestadas por los profesores universitarios en relación con el uso del e-learning. La tercera parte es el análisis de los resultados de la investigación, que presenta resúmenes detallados de cada aspecto del aprendizaje electrónico. La sección final resume los resultados de la investigación y formula recomendaciones para las instituciones de educación superior sobre la enseñanza a distancia.

P a l a b r a s c l a v e: e-learning, aprendizaje a distancia, emociones, actitud de los componentes, profesor universitario