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Sensory Preferences of Teachers in the Context of Computer Educational Tools Using*

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Abstract
The article is an attempt to show the relationship between teachers' sensory preferences (represented by the VAK model) and the degree of acceptance, level of application, and form of work with new media. The article presents the results of pilot studies, as well as the results of the proper research conducted in 2019 in a group of 367 teachers. The research referred to was carried out in the Kujawsko-Pomorskie Voivodeship (Poland). The selection of the research group was random. The research was quantitative, and additionally supported by qualitative analysis. The statistics presented were determined using the χ^2 test, as well as using the Cramer V coefficient. The conducted research shows, that sensory preferences of respondents do not remain indifferent to the learning process. They determine the activities of teachers and directly create a working environment for students.

Keywords: sensory preferences, primary education teachers, computer educational tools, new technologies.

Learning styles and the sensory system – introduction to the issue

According to the PWN encyclopedia (Krupa, 2003), a system is "an arrangement of interconnected elements, fulfilling a specific function and treated as isolated

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from the environment for a specific purpose". This term refers to practically all fields of science, various phenomena, objects, and processes occurring in nature and generated by people. In pedagogical sciences the term is used, among others, for the purpose of learning, teaching, or upbringing (Krupa, 2003).

The sensory system is usually identified with an individual learning strategy and communication with the environment. It is a characteristic way of perceiving and processing information for each individual (Kozielska, 2012, p. 241). In the pedagogical sciences, there are usually three basic styles of perceiving knowledge: visual, audial, and kinaesthetic (Christov, 1994; Simmonds 2014). Tsanyo Christov in his developed specification proposes a division into: a tri-channel learner (receiving external stimuli through all three channels – that is visual, audial, and kinaesthetic at the same time), dual channel learner (characterized by visual-audial, visual-kinaesthetic, or auditory-kinaesthetic preferences) and monosensory learner having perceptual abilities narrowed to one of the three channels (1994, p. 28). Some researchers, including Ricki Linksman (2013), additionally isolate the sensory style from the kinaesthetic area, associated with a strong touch response experienced on the skin surface (VAKT[1]). Although the issues related to the sensory system are mainly analysed from the perspective of learners, it is worth recalling that this issue can also be considered in the context of teachers. It would then be justified to refer to a slightly broader definition, which states that ‚The sensory system is part of our personal, specific, neurological cabling' (Taraszkiewicz, 2020, p. 2), which, firstly, determines how we perceive the reality around us, secondly, determines how we create our representation of the world, and thirdly, is crucial in the context of describing, presenting, and explaining our point of view to others. In the case of teachers, sensory preferences are evident in the selection and preparation of materials as well as in communication with students (Taraszkiewicz, 2020). Sensory preferences directly determine the teaching style used by teachers (Peacock, 2001). According to Małgorzata Taraszkiewicz and Agnieszka Karpa – the lack of correspondence between the teacher's and student's sensory preferences and, consequently, the diverging preferences related to teaching and learning styles usually result in an under-assessment of the child, who, in the teacher's opinion, starts to be perceived as difficult and unteachable (Taraszkiewicz & Karpa, 2009, p. 15).

The teaching style is „a general approach to working with the student, which is a function of scholarly and colloquial knowledge, beliefs, and at-

[1] VAKT – abbreviation for visual, audial, kinaesthetic, and tactile.

titudes formed on the basis of educational experience and the current social and financial conditions of the school" (Gołębniak, 2004, p. 161). The subject literature emphasizes that teaching style refers to the preferred methods of educational work, as well as a set of individual characteristics which are responsible for a specific way of acting of the teacher (Pilch, 2006, p. 1106). Among the classifications of teaching styles in the field of educational theory, the division developed by Ned Flanders distinguishes between the directive and reactive style of the teacher (Flanders, 1962, pp. 313–316) and the classification of Gary Fenstermacher and Jonas Soltis showing the teacher as a representative of the managerial, therapeutic, or liberating style (2000, pp. 24–25) has been favoured. Maria Kozielska emphasizes that „teaching styles are various ways of understanding and implementing the teaching process. (...) Depending on the content of the subject taught and the resulting teaching situations, a teacher can be a manager, a therapist, or a negotiator" (Kozielska, 2009, p. 170).

The teacher's sensory preferences, the teaching style they determine, as well as the children's learning styles are apparently three separate spaces relating to different individuals and their personal characteristics. However, the educational reality is somewhat more complicated – full of overt as well as covert relationships, cause and effect relationships, and one-way relationships. A deeper analysis of the problem makes us aware that the teacher's sensory system, which determines his or her teaching style and the choice of educational resources, is not indifferent to the children's learning style. It can also stimulate or suppress the development of their sensory preferences. Learning styles, as emphasized by Frederic Vester, are determined, among other things, by genetic factors including, for example, sensory and environmental preferences, which may include the form of work in the classroom (e.g. group or individual), the nature of the materials presented by the teacher (e.g. tailored to people with visual, auditory preferences, etc.), the pattern and way in which the teacher delivers his or her daily lessons (e.g. activating, passive), as well as the teaching style of the teacher (e.g. stimulating activities, cognitive, affective, physical, or psychological style (Vester, 2006, p. 126). In the context of sensory preferences, it is worth realizing that they determine the selection of teaching materials with specific properties. As a result, a teacher with the dominance of the visual channel will, during classes, reach for resources stimulating the sense of sight: presentations, visualizations, diagrams, charts, etc. His or her activities and educational resources will reward students with similar sensory preferences, inhibiting the development of their other sensory competences (Vester, 2006, pp. 90–94, 237–239).

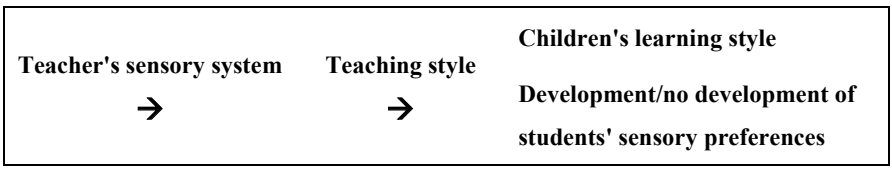


Figure 1. The resultant relationship between the teacher's sensory system and his or her teaching and the children's learning style.

Source: Author's elaboration.

It should therefore be stressed that the teacher's sensory preferences and the teaching style resulting from the above are of far-reaching importance for the child's learning style, the development (or lack of development) of the student's sensory preferences and, consequently, for his or her achievement. Therefore, when analysing the personal qualities of the teacher as well as the teaching style he or she uses, it is important to be aware of the above consequences. For this reason, the author has decided to make the reader more familiar with what this style of learning is. Douglas Brown emphasizes that "style is a term that refers to constant and rather persistent tendencies or preferences within an individual. Styles are the general features of intellectual functioning ..." (Brown, 2000, p. 113). Under the term 'learning style' the author understands how individuals perceive and process information during the learning process (Brown, 2000). A similar point of view is presented by Maria Ledzińska and Ewa Czerniawska (2011), according to whom the learning style is "a procedure usually adopted by the learner in the learning situations as a preference for using specific strategies, regardless of the requirements of specific tasks" (p. 127). Also, Peter Honey and Alan Mumford (1992) equate the learning style with relatively constant indicators of learning, interacting with, and responding to, the environment, resulting from cognitive, affective, social, and physiological behaviour. A similar way of referring to this issue can be found in the publications by Angus Duff, Tim Duffy (2002), and Dorothy MacKeracher (2004).

M. Taraszkiewicz (2014) emphasizes that each person has his or her own personal learning style which is a combination of several factors, among which she lists: sensory preferences and the associated system in terms of the leading eye, ear, arm and leg, the domination of one of the hemispheres of the brain, and the profiles of multiple intelligences, developed in a specific way. "As a result of proper information processing, people learn so-called sensory input, this information (visual, audial, kinaesthetic and sensory, including prioproreceptive)

coincide in a certain area of the brain where sensory integration takes place" (Taraszkiewicz, 2014, p. 152).

The VAK[2] model and neurodidactics

For many years, it has been emphasized in the literature of the subject that a high level of correspondence between the sensory properties of the message and the individual predispositions of trainees affects the degree of effectiveness of the teaching and learning process, and "is the key to success in learning and a professional career" (Dryden & Vos, 2003, p. 358). This idea, although known and respected by many teachers, has recently started to be denied.

Gary Stix (2011) emphasizes that the accumulated research results do not confirm the relationship between more effective learning and the use of the preferred senses (p. 50–57). In 2017, thirty well known scientists, including: Steven Pinker, Dorothy Bishop and Uta Frith, sent a letter to The Guardian expressing their concern about the popularity of the VAK model. The scientists have defined the science directly focused on sensory skills as "one of many neuro-myths that do not contribute to the strengthening of education" (Weale, 2017). The extensive research carried out by John Hattie (2015) and based on the synthesis of 1,200 meta-analyses on the impact of various factors on student achievement has shown that the relationship between the learning style and the student performance is minimal. The analyses carried out on the basis of 195 comparisons have shown that the verified factor takes the value of 0.23, where the minimum Hattie threshold, according to which the element is qualified to a place in the set of what is valuable and has a real impact on the education process, is 0.40 (Hattie, 2015).

The aforementioned views and results of analyses fully justify the statement of Bruce Hood, head of the department of developmental psychology at the University of Bristol, who emphasizes that referring to the theory of learning styles in pedagogical practice has no scientific or biological justification (Weale, 2017). From the above it can be concluded that the compatibility of the teacher's and student's sensory preferences, and thus the compatibility of the style of teaching (teacher) and learning (child) are not relevant to the students' achievements. On the other hand, according to Rick Linksman's thesis, we are endowed with an "educational superlink" that combines the chosen style of teaching and learning with the activity of a specific part of the brain, re-

[2] VAK – abbreviation for visual, audial, and kinaesthetic.

sponsible for the processing and storing of information (Linksman, 2013). The published research proves that over time, brain preferences regarding activity supported by individual senses become more precise, thus creating a stronger fusion with the selected organ (Saeed et al., 2015, pp. 1–14). As a consequence, an increase in the number of synapses strengthening the dominant sense organ can be observed, which, thanks to its properties, begins to determine the nature of teaching and learning. Thus, the visual will better 'read' the visual material, the auditory will better 'read' the sound material, and the kinaesthetic will better 'read' the material that stimulates movement.

Methodological basis for author's research

The main goal of the presented project was to examine the relationship between the sensory preferences of educators defined by the VAK model, and:

- the kind of computer teaching tools used in the teaching process,
- the form of using IT tools, and the style of teaching adopted when using them.

The presented research was carried out in 2017 as part of the educational grant, and its coverage included teachers from the level of early school education (120 people), selected at random (Kuyavian-Pomeranian Voivodeship schools, Poland). In order to authenticate the results, the developed procedure was repeated, and in 2019, the data from a group of 367 people were collected. The selection was multi-stage. From the previously drawn census of primary schools in the Kuyavian-Pomeranian Voivodeship, a school was drawn, and then about 50% of the teachers from the given school (if the number of teachers in a given school was odd, then it was divided in half and then rounded down to its full value). The research group consisted of women only. The socio-demographic-occupational distribution in both 2017 and 2019 had similar values, and as shown by the correlation of rho Spearman and the Chi test, there was no correlation between the variables: gender, job seniority, age, teacher education, and the analysed variables (at the significance level $\alpha = 0.05$).

The research was quantitative, and additionally supported by qualitative analysis. The source of quantitative data that served as the basis for comprehensive analyses were: sensory competence tests[3] and mixed surveys. In addition to open questions, the worksheets contained closed questions regarding the degree of acceptance, for which the answers were set on a five-point scale (I do not

[3] The researcher used the WAK sensory preferences test, from the book C. Plewka & M. Taraszkiewicz (2010). *Uczymy się uczyć* [We Learn to Learn]. Szczecin: Towarzystwo Wiedzy Powszechnej Oddział Regionalny w Szczecinie, pp. 244–246.

accept at all, I do not accept, I have no opinion on this topic, I accept, I accept it very much). The qualitative data were collected based on partially directed interviews and observations (Rubacha, 2011).

The data analysis was carried out using the Chi square test (χ^2). The measure of the relationship between the two variables was determined using the Cramer V coefficient.

Specific questions:

(1.1.) Do teachers' sensory preferences affect the level of acceptance and assessment of computer teaching tools?

(1.2.) Do teachers' sensory preferences affect the choice of computer teaching tools used in the teaching process?

(2.1.) Do teachers' sensory preferences affect the way digital educational resources are developed?

(2.2.) Do teachers' sensory preferences affect the style and teaching methods used when working with computer teaching tools?

Conclusions from the research

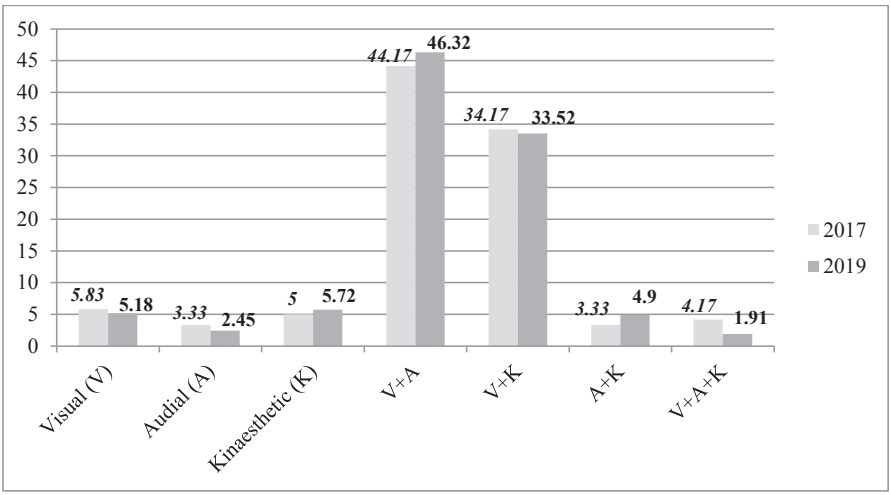
The research which was carried out in 2017–2019 showed that:

- around 13% of teachers are mono-sensor persons (14.17%, 13.35%**)
- around 85% of teachers are bi-sensor persons (84.74%*, 81.67%**),
- approx. 2% of teachers receive information via three channels (1.91%*, 4.17%**)

The data collected on the basis of a survey carried out in 2017 and 2019 showed that there is a statistically significant relationship between the sensory preferences of teachers and the level of acceptance of computer teaching tools ($p=0.000$ for $\alpha=0.05$; therefore $p<\alpha$). The strength of the relationship between variables was determined using the Cramer V coefficient, which assumed the value of $V=0.514^*$. Because in each case $V>0.5$, therefore, the relationship is strong. Based on the answers, it can be concluded that IT tools are those least accepted by audials.

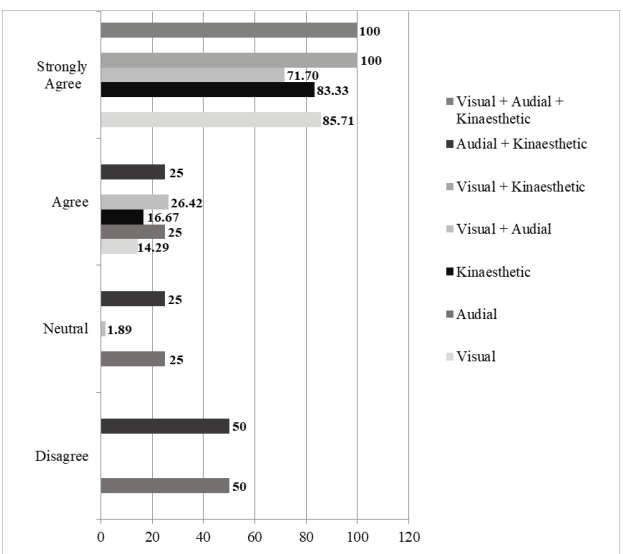
** Research carried out in 2019.

* Research carried out in 2017.



Graph 1. Sensory competences of teachers (value by the percent).

Source: Author's research.



Graph 2. Acceptance level of computer teaching tools in the context of the (VAK) sensory competence of teachers – research carried out in 2017 (value by the percent).

Source: Author's research

The study carried out two years later confirmed the above tendency ($p=0.000$ for $\alpha=0.05$; therefore $p<\alpha$; $V=0.592$). The teachers characterized by the visual, kinaesthetic, or mixed styles (where one of the senses is the sense of sight) accept computer teaching tools more than people with audial preferences. As a consequence, declarations of the non-acceptance of computer teaching tools appeared only in the group in which the teachers had audial preferences: Audial, and Audial + Kinaesthetic.

Table 1. The acceptance level of computer teaching tools in the context of the (VAK) sensory competence of teachers – research carried out in 2019 (value by the percent).

	Disagree	Neutral	Agree	Strongly Agree
Visual			5.26	94.74
Audial	22.22	44.44	33.33	
Kinaesthetic			23.81	76.19
Visual + Audial			37.65	62.35
Visual + Kinaesthetic			3.25	96.75
Audial + Kinaesthetic	50	44.44	5.56	
Visual + Audial + Kinaesthetic				100

Source: Author's research.

None of the surveyed teachers indicated that they did not accept computer teaching tools very much.

The analysis of the collected data showed that there is a statistically significant relationship between the sensory preferences of teachers and their assessment of computer teaching tools (Table 2).

Although most educators positively refer to innovative didactic tools, it has been found that there is a significant difference between the assessments made by sensorially different groups (Table 3). The grades given by the teachers were on the scale of natural values from 1 to 5, where 5 was identified with the highest score. It was noted that the lack of acceptance for IT tools and the level 2 rating were reported only by the audials (in the case of working with interactive games) and the sensorially dual audial-kinaesthetic group (in the case of working with tablets and smartphones).

Table 2. The Chi square test results (2) and the Cramer V coefficient determined for variables, sensory preferences and tools (A –IWB, B – tablet, C – smartphone, D – interactive games, E – multibooks).

		Sensory preferences * tool (A, B, C, D, or E)				
		(A)	(B)	(C)	(D)	(E)
2017	Asymptotic significance	.000	.000	.000	.000	.000
		(p=0.00 for α=0.05; therefore p< α)				
	V-Cramer	.563	.656	.625	.492	.527
		V>0.5 relationship to strong character			0,3<V<0.5 relationship moderate relationship	V>0.5 relationship strong relationship
2019	Asymptotic significance	.000	.000	.000	.000	.000
		(p=0.00 for α=0.05; therefore p<α)				
	V-Cramer	.610	.668	.666	.676	.712
		V>0.5 relationship to strong character				

Source: Author's research.

Table 3. Assessment of the acceptance of individual information technology tools, data from 2019. Part 1 (value by the percent).

	min.		**RATING**		max.
	1	2	3	4	5
IWB				*Visuals (21.05)*	*Visuals (78.95)*
			Audials (33.33)	**Audials (55.56)**	**Audials (11.11)**
				Kinaesthetics (57.14)	*Kinaesthetics (42.86)*
				V+A (38.82)	**V+A (61.18)**
				V+K (6.5)	*V+K (93.5)*
			A+K (66.67)	**A+K (27.78)**	**A+K (5.56)**
				A+V+K (14.2)	*A+V+K (85.71)*
Tablet				**Visuals (73.68)**	**Visuals (26.32)**
			Audials (44.44)	*Audials (44.44)*	*Audials (11.11)*
				Kinaesthetics (61.9)	**Kinaesthetics (38.1)**
				V+A (83.53)	*V+A (16.47)*
				V+K (10.57)	**V+K (89. 43)**
		A+K (5.56)	*A+K (77.78)*	*A+K (16.67)*	
					A+V+K (100)

Table 3. Assessment of the acceptance of individual information technology tools, data from 2019. Part 1 (value by the percent).

	min.		RATING		max.
	1	2	3	4	5
Smartphone			*Visuals (15.79)*	*Visuals (68.42)*	*Visuals (15.79)*
			Audials (44.44)	**Audials (55.56)**	
				Kinaesthetics (80.95)	*Kinaesthetics (19.05)*
				V+A (97.65)	**V+A (2.35)**
				V+K (11.38)	*V+K (88.62)*
			A+K (55.56)	**A+K (44.44)**	
			V+A+K (14.29)	*V+A+K (42.86)*	*V+A+K (42.86)*

Source: Author's research.

Table 4. Assessment of the acceptance of individual information technology tools, data from 2019. Part 2 (value by the percent).

	min.		RATING		max.
	1	2	3	4	5
Interactive games				**Visuals (89.47)**	**Visuals (10.53)**
		Audials (11.11)	*Audials (55.56)*	*Audials (22.22)*	Audials (11.11)
				Kinaesthetics (42.86)	**Kinaesthetics (57.14)**
				V+A (79.41)	*V+A (20.59)*
				V+K (4.07)	**V+K (95.93)**
			A+K (83.33)	A+K (16.67)	
				V+A+K (42.86)	**V+A+K (57.14)**
Multibooks				*Visuals (57.89)*	*Visuals (42.11)*
			Audials (22.22)	**Audials (55.56)**	**Audials (22.22)**
				Kinaesthetics (52.38)	*Kinaesthetics (47.61)*
				V+A (70)	**V+A (30)**
				V+K (8.94)	*V+K (91.06)*
			A+K (77.78)	**A+K (22.22)**	
				V+A+K (28.57)	*V+A+K (71.43)*

Source: Author's research.

Similar results were obtained as part of the pilot studies carried out in 2017.

The relationships established in the course of the observations and interviews showed that the sensory preferences of teachers determine significantly

the choice of computer teaching tools used in the teaching process. Visual learners prefer the visual message. As a consequence, they use an interactive whiteboard (mainly as a projector) and multibooks in their work. Multimedia presentations, animations, films, and graphics play a big role in their activities. In the case of kinaesthetics, there was a great interest in interactive forms of work supported by the multimedia board, the internet, educational multimedia games, and multibooks. The kinaesthetics, as the only group, declared that in their work (if it is possible) they use tablets or smartphones. Computerized didactic tools were used by to the least extent the audials, who often did not even start the multimedia board in the course of their classes or used it like a traditional board. This group more often used CD players or recordings in which sound, and not visualization played a significant role. Consequently, these preferences have not been indifferent to the development and, more specifically, to the collection of digital educational resources. It should be emphasized that Polish teachers prefer to use ready-made digital resources, thus giving up their development. Consequently, the author recommends that, in the context of teachers from the level of early childhood education and information technology, the term 'development of educational materials' should not be used, but rather the collection or adaptation to the needs of lessons of ready-made resources available on CDs or on the Internet (websites of publishers, magazines, social networking sites, educational portals, etc.). Summarizing the above, teachers with visual preferences collect mainly presentations, films, and animations. Kinaesthetics choose games and interactive educational exercises. To the smallest degree multimedia are used by the audials who appreciate the ability to play sounds in their work.

It was noted that the sensory preferences of teachers do not affect the teaching methods used when working with computer teaching tools. Teachers, regardless of their sensory preferences, work in classes in a traditional way, possibly supported by information technology tools. Lessons, therefore, are mainly dominated by the teacher who explains, writes, and creates their entire course. New material is also consolidated using search methods, in which children jointly with teacher solve exercises and problem tasks.

It is worth emphasizing that the style of the materials handed over is strongly associated with the sensory preferences of teachers and fully reproduces them. 86.38% of teachers surveyed are not aware of the fact that the style of the materials presented in class is related to the presented sensory preferences.

Summary

Although the compatibility of teachers' and pupils' sensory preferences (and consequently the natural adaptation of didactic resources to children's abilities), as many researchers have pointed out, does not increase teaching and learning efficiency[4], it is worth emphasizing, however, that teachers' sensory preferences do not remain indifferent to the educational process. They determine the activities of teachers and directly create a working environment for students. The collected data show that there is a statistically significant relationship between the sensorial preferences of teachers and the level of acceptance of computer teaching tools. On the basis of the studies carried out, there is a trend that says, that the only groups that do not accept working with the mentioned tools are audials and people with audial-kinaesthetic preferences. Why? This situation is the result of an unprofitable ratio of workload to benefits that may result from the use of new media. Obviously, computer teaching tools make it possible to stimulate the sense of hearing by means of recordings or sounds indicating correct as well as incorrect performance of a task, which, however, is not appreciated by teachers. Teachers point out that recordings can be played from CDs, and comments on exercises to be solved are definitely better expressed on one's own.

In the case of visuals or kinaesthetics, the situation is slightly different. Teachers with the above preferences, unlike audials, accept interactive computer tools more widely, and the possibilities of their use are also much wider. These include: the active search for information and visual messages by students; observations of various phenomena and objects distant in time and space, located in their natural environment (preserved context); a chance to analyse enlarged objects, phenomena occurring in nature and determining life processes; the abil-

[4] After Kazimierz Denek – „teaching efficiency is a synthetic quality indicator of the learning process in terms of students' assimilation of new knowledge, their understanding, their ability to use knowledge in typical and new situations, and changes in their psyche" (Denek, 1992, p. 41–42). Meanwhile, Waldemar Furmanek points out that the problem of educational effectiveness can be considered in two ways – wider and narrower. „In a narrower sense, we assess the degree of achievement of the assumed educational goals. Such an understanding of effectiveness is applied in the contexts of both formal and informal education. (…) In this sense, effectiveness indicates whether there is an improvement, and if so what improvement, in people's performance is achieved as a result of educational processes. (...) In a broader sense, educational effectiveness is the degree of realization of the assumed – usually the main – teaching goals or postulated teleological functions. Effectiveness in this context has an evaluative character and is a measure of the quality of the process; a measure determined by appropriate procedures which make it possible to grasp its multiple aspects" (Furmanek, 2012, pp. 16–17).

ity to create, construct, and manipulate 3D objects; analysing photographed or recorded objects, etc.

The level of acceptance translates into an assessment of the usefulness and choice of computer teaching tools used in everyday practice. Consequently, visual teachers use an interactive whiteboard and multibooks in their daily activities. In the case of kinaesthetics, there has been great interest in interactive resources presented using a multimedia board with an internet connection. Multimedia educational games and resources presented in multibooks have also proved to be important. The kinaesthetics, as the only group, declared that in their work (if it was possible) they used tablets or smartphones. Computerized didactic tools were used to the least extent by the audials, who often did not even start the multimedia board in the course of their classes or used it like a traditional board. This group, with a choice of interactive boards, tablets, and CD players, prefers the last tool. The described attitudes of the teaching staff shake up the vision of education tailored to a wide audience, meeting the needs of all, not just a specific group of children. The above author's point of view is not isolated. Maria Kozielska emphasizes (2012) that „visual artists learn with best effect when they see something, audials get more information from words, statements, and explanations, while kinaesthetics learn more effectively when they do something, construct it, etc. Hence, the group of students as a whole gains most information from the content presented in all the forms mentioned. This is an important indication for educators to enable students to learn using their preferred sensory systems and to help educate other systems, not previously used" (Kozielska, 2012, p. 246). Mariola Piłatowska also emphasizes (2008) that it is the teacher's duty to introduce various forms of activity into the educational process, making it possible to establish relationships with the entire group, and not just individual students. The above form has a broader scope, and as well is more deeply remembered (p. 122). The importance of multisensory transmission (easier to implement thanks to computer tools) is demonstrated by the results of the research conducted by Melissa Stoffers (2011) or Kamila Majewska (Siemieniecka et al., 2017). The cited authors indicate that polysensory teaching supports the process of understanding, remembering, analysing, synthesizing, using, and evaluating the acquired information. The reasons for the above state should be seen within the limits of our memory, which are wider if more factors participate in cognition. Some scientists, including: Ladan Shams, Aaron R. Seitz (2008), and Bronisław Siemieniecki (2013) suspect that under the influence of evolution, human cognitive mechanisms have adapted to multisensory reception and the processing of signals, so increasing the chance of species

survival. As a result, the variety of stimuli present in the environment stimulates development. Interactive computer tools facilitate the implementation of multisensory education. Their proper inclusion in the course of lessons is, therefore, extremely important and should be used by every teacher. This process is extremely complicated. It requires extensive knowledge, skills, access to efficient equipment, and a positive attitude to the use of interactive computer tools. These last tools are related to the sensory preferences of teachers.

I fear that the issue of the proper and sustainable use of new media in education will fall to the lot of the government and the academic community only when the level of school equipment with the above-mentioned tools is equalized. Currently, the weak and uneven (on the national scale) equipping of educational facilities with interactive computer tools means that the problem is not recognized. Children (and consequently also parents) enjoy having any access to new technologies. Meanwhile, the form, the way they are used, and the preparation of teachers to support educational activities with various multimedia are shifting to the background. As a result, a huge number of teachers do not have sufficient competence to develop materials properly. This task is so difficult and time-consuming for teachers that they usually do not attempt to prepare by themselves the resources used in the lesson. Classes are, therefore, partly reproductive, based on ready-made tasks, exercises, presentations, etc. It is therefore appropriate to see early childhood education teachers, not as creators of multimedia exercises, tasks, and information bases, but rather as stylists who collect and adapt ready-made materials to the needs of specific lessons. The nature of the resources used is fully determined by preferences, and so teachers – visuals collect mainly presentations, films, and animations. Kinaesthetics choose games and interactive educational exercises. To the smallest degree multimedia are used by the audials who appreciate the ability to play sounds in their work. From the evidence of the collected data, it can be assumed that with the generational change, people for whom it will be natural to create computerized teaching bases will start working in schools. In their case sensory preferences will influence the way digital content is developed, bringing it closer to one' s preferred sensory style. In conclusion, sensory preferences are currently relevant to the collection of resources developed by others and are likely to be reflected in the future in their own materials.

It arises from the analyses that the sensory preferences of teachers do not affect the teaching methods used when working with computer teaching tools. Teachers, regardless of their sensory preferences, work in classes in a traditional way, possibly supported by information technology tools. This form is the

result of a lack of knowledge, skills, and experience. The question arises as to what the activities of individual, sensorially different groups will look like after the above deficiencies have been made up for.

The analyses carried out support the following conclusion – the complementation by teachers of skills and knowledge of new teaching methods used when working with computerized teaching tools will result in the relationship between the sensory preferences shown by teachers and the teaching methods they use (corresponding to these preferences). It can also be assumed that teachers who manoeuvre smoothly in the space of new media will start to develop educational resources on their own, supporting the teaching process. Thus, the tasks presented to the students will be complemented with exercises prepared individually by the lesson teacher. Of course, the resources to be developed in the future, similarly to those currently collected, will exhibit features specific to each of the teachers and resulting from sensory preferences. As a result, the author has decided to join Kozielska's appeal and demand that the teaching staff, regardless of their sensory preferences, start using a variety of computer-based didactic tools, as well as interactive educational resources that meet the needs of a wide audience. It is important for teachers to be aware of this relationship and to be able to control their actions.

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