

## Special Education Teachers' Attitudes, Motivation, and Competencies for Using Assistive Technology

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**Abstract** People with intellectual disabilities (ID) experience difficulties in all domains of daily functioning, and assistive technology (AT) can be used as a way to overcome some of these deficits. The objective of this paper is to review the research conducted to examine the attitudes and motivation of special education teachers towards the use of AT, as well as research aimed at examining the level of competence of special education teachers in the application of AT. A review of the available literature was conducted using the *Google Scholar*, *Scopus*, *Web of Science*, and *ProQuest* search engines, and the review included those articles that are of a review and research nature, which sampled special education teachers, as well as teachers who work with people with ID, and which were published in the last ten years. This review showed that special education teachers were motivated to use AT in teaching, and that they demonstrated positive attitudes toward its use, however, they did not have sufficiently developed competencies for using AT. Due to all of the above, it is of great importance to conduct training aimed at increasing the competencies of special education teachers in the field of AT, because in this way their attitudes and motivation towards further use could be improved.

**Keywords:** 1. Assistive technology; 2. Special education teachers; 3. attitudes; 4. motivation; 5. competencies

## Stavovi, motivacija i kompetencije defektologa za upotrebu asistivne tehnologije

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**Sažetak** Osobe s intelektualnom ometenošću (IO) ispoljavaju teškoće u svim domenama svakodnevnog funkcioniranja i kao način savladavanja nekih od tih deficita može se koristiti asistivna tehnologija (AT). Cilj ovog rada je napraviti pregled istraživanja provedenih u cilju ispitivanja stavova i motivacije defektologa prema upotrebi AT, kao i onih usmjerenih na ispitivanje stupnja kompetentnosti defektologa u primjeni AT. Pregled dostupne literature izvršen je korištenjem pretraživača *Google Scholar*, *Scopus*, *Web of Science* i *ProQuest*, a u pregledni dio rada uključivani su oni radovi koji su preglednog i istraživačkog karaktera, koji su uzorkom obuhvatili defektologe, kao i nastavnike koji rade s osobama s IO, a koji su objavljeni u posljednjih deset godina. Defektolozi su motivirani da primjenjuju AT u nastavi, imaju pozitivne stavove prema njezinoj upotrebi, međutim i da nemaju u dovoljnoj mjeri razvijene kompetencije za korištenje AT. Od velikog je značaja provoditi obuke usmjerene na povećanje kompetencija defektologa u području AT-a, jer se na taj način posljedično mogu poboljšati njihovi stavovi i motivacija prema daljnjoj upotrebi.

**Ključne riječi:** 1. Asistivna tehnologija; 2. Defektolozi; 3. stavovi; 4. motivacija; 5. kompetencije



## 1 Introduction

People with intellectual disability (ID) show difficulties in all domains of daily functioning (Cooper et al., 2015; Fletcher et al., 2018), and assistive technology (AT) can be used as a way to overcome some of these deficits (MacLachlan et al., 2018). AT refers to any technological system or device that, through its use, enables the improvement of the functional ability of persons with ID and consequently leads to the improvement of their quality of life (Stanković, 2015; Zapf et al., 2016).

AT can be in the form of a device specifically intended for people with ID, or it can also be an application or a device that is used by people in the typical population, but can also be used by people with ID (Aronson, 2014) to reduce or eliminate some deficits (Mechling, 2007).

The application of AT allows for the compensation of functional limitations and improves the ability to learn, or mobility (Maćešić-Petrović and Đurić-Zdravković, 2009; Vuković, 2010). Apart from the above, the application of AT by people with ID can result in improvement in many skills (Lancioni & Singh, 2014; Sze, 2009), such as communication (Caligari et al., 2013; Rispoli et al., 2010) and socialisation (Carver et al., 2016; Faucett et al., 2017; Owuor et al., 2017). In addition, people with ID can use AT to increase daily independence (Bennett et al., 2018; Stephenson & Limbrick, 2015), spatial orientation (Morash-Macneil et al., 2018; Sorgini et al., 2018) or independent preparation of meals (Pinard et al., 2021), as well as to increase work productivity (Collins & Collet-Klingenberg, 2018) or better spending of free time and recreation (Lersilp et al., 2018; Zilz & Pang, 2021).

It is of great importance to know special education teachers' attitudes towards the use of AT in teaching (Ahmed, 2018), because they are the ones that teach individuals with ID (Kirby, 2017; Zigmond & Kloo, 2017). Research shows that the attitudes of special education teachers, as well as the degree to which they apply AT in their daily work with people with ID, are influenced by the level of competence in the application of certain types of AT (Nordström et al., 2018; Zapf et al., 2016). Apart from the insufficiently developed competencies of special education teachers concerning the application of certain types of AT in teaching, the lack of frequency of application of AT in teaching by special education teachers is also influenced by their motivation to increase their competence in that area, which is manifested through their intrinsic motivation for various technological achievements (Nordstrom et al., 2018; Sharma & Srivastava, 2020).

This review paper aims to provide an overview of the research carried out to examine the attitudes of special education teachers towards the use of AT in teaching, of research that examined the degree of competence of special education teachers in the application of AT, as well as an overview of research that studied the motivation of special education teachers to use AT.

## **2 Methodology**

A review of the available literature was performed using the *Google Scholar*, *Scopus*, *Web of Science*, and *ProQuest* search engines. The search was performed using keywords that are crossed with each other, and which refer to the following words and phrases: assistive technology, technology, special education teachers, attitudes, competencies, and motivation. The review part included those articles that are of a review and research nature, whose sample included special education teachers, as well as teachers who work with people with ID, and which were published in the last ten years (2013-2023).

## **3 Literature review**

### ***3.1 Attitudes of special education teachers towards the use of assistive technology in teaching***

Attitude implies a mental state of readiness of the organism, which is based on the individual's experience, and which has a direct and dynamic influence on the individual's relations with all the objects and situations they encounter (Nakić, 2014). Attitude is a relatively permanent and stable organisation of positive or negative emotions, evaluations, and reactions towards an object, group of people, or situations, and as such an attitude towards a phenomenon determines what behavior an individual will have and it affects the behavior of the individual (Jonjić, 2017).

Research shows that special education teachers have very positive attitudes (Atanga et al., 2020; Onivehu et al., 2017; Siyam, 2019) or moderately positive attitudes towards the application of AT in teaching and working with children with ID, but also that they do not use AT sufficiently (Ahmed, 2018; Arulsamy & Murugaiyan, 2013).

In a study (Alanazi, 2019) in which 424 special education teachers participated, it was found that the most positive attitudes about the application

of AT in teaching children with ID were displayed by those special education teachers who teach in primary schools, followed by those with more years of work experience, as well as those with a higher degree of education. Findings related to education were also obtained in the results of the research conducted in our region. In his research, Milojević (2020) obtained the data that the most important predictor of positive attitudes towards the use of AT in teaching is the education degree. Special education teachers can work in the Republic of Serbia after they finish their bachelor's degree in special education. However, they can also finish a master's degree, which is something the majority does. Also, special education teachers have more positive attitudes towards the use of AT in working with children with ID than regular teachers (Milojević, 2020).

Some of the significant predictors of the positive attitudes of special education teachers toward the use of AT in teaching are a greater degree of knowledge about different types of AT, as well as ways of using them in teaching (Alkahtani, 2013; Yeşilyurt et al., 2016), followed by the self-efficacy of special education teachers and their degree of digital literacy (Yeşilyurt et al., 2016). In addition to the above, the perceived ease of use of a certain device, the complexity of a certain AT device, as well as the perception of special education teachers about the usefulness of a certain device with the population of children they work with stand out as significant predictors (Teo et al., 2016).

However, some studies did not find a connection between the positive attitudes of special education teachers about the use of AT in working with children with ID when it comes to the gender of the special education teacher, years of service, the type of disability of the population of children they work with, as well as the age of the children they work with (Onivehu et al., 2017; Song et al., 2019).

### *3.2 Competencies of special education teachers in the application of assistive technology*

Competency includes a set of behaviors, knowledge, and attitudes that reflect on the adequate performance of work, and the achievement of work goals (Hercigonja, 2018).

A large number of foreign studies indicate that special education teachers have insufficiently developed competencies in the field of application of different types of AT (Alkahtani, 2013; Atanga et al., 2020; Onivehu et al., 2017). However, domestic research shows that special education teachers consider themselves competent in the application of AT in teaching and working with people with ID (Arsenić et al., 2022; Daničić, 2021; Jankelin and Slavković,

2020), even though that is not sometimes true due to the rapid development of AT.

Research (Gustafson, 2006; Lahm & Niekels, 1999) that directly assessed the competency of special education teachers on the application of AT in teaching indicates that they have a low level of competency in the application of various types of AT and that over 90% of special education teachers believe that it is necessary to increase them (Alsolami, 2022). Such findings may indicate that special education teachers from our region do not adequately assess the degree of development of their competencies in the application of AT.

The fact that the implementation of interventions aimed at increasing the knowledge of special education teachers on the application of AT in working with people with ID leads to a real increase in competency is also evidenced by research in which the authors conducted training with special education teachers on the application of different types of AT in working with children with ID. The results showed that the implementation of the training led to an increase in competencies, and consequently to an improvement in the attitudes of special education teachers about the application of AT in teaching (Khalil & Hantira, 2022).

The biggest predictor of a higher degree of competency was the frequent use of AT in working with people with ID and a younger biological age of the special education teachers (Jones et al., 2019; Svensson et al., 2021). Adopting new technologies and devices may be more difficult for older special education teachers, as they have not had the same exposure to technology throughout their lives (Arslan-Ari & Başer, 2022). Research shows that, with appropriate training and support, special education teachers with less AT experience can develop their skills and use AT in classrooms (Arslan-Ari & Başer, 2022). Gender and years of service did not prove to be predictors of competence in the application of AT (Arsenić et al., 2022; Daničić, 2021).

In the research of domestic authors, in which the sample consisted of three groups of respondents who work with children with ID, i.e. classroom teachers, subject teachers, and special education teachers of different profiles, it was found that special education teachers considered themselves more competent than subject education teachers and classroom teachers for the application of AT (Arsenić et al., 2022; Daničić, 2021). Such findings may be the result of greater information and knowledge acquired during undergraduate studies, which relate to the characteristics of persons with ID, as well as types of AT.

### *3.3 The motivation of special education teachers for the use of assistive technology*

Motivation is defined as the desire and energy that moves people to achieve a certain goal (Han & Yin, 2016). Teacher motivation is an area that is continuously receiving attention in research. In his study, Boru (Börü, 2018) points out the existence of intrinsic and extrinsic factors that can influence teacher motivation. Intrinsic factors are connected with personal characteristics, desires, and independence in work, while external ones refer to the educational system in which they work. When discussing the motivation of special education teachers, they point out that they are most motivated in their work by the creativity they can demonstrate when teaching, as well as the subsequent achievements of students, however, as external factors that negatively affect motivation, they point out low salaries, a slow and limited promotion process, as well as a lack of financial resources for materials used to support students (Yasmeen et al., 2019).

Special education teachers point out that they find the application of AT interesting not only for themselves, but also for the people with ID with whom they work (Alper & Goggin, 2017). In addition, seeing the benefits that AT brings in the context of the progress of children with ID leads to an increase in the motivation for further use of AT among special education teachers (Ahmed, 2018; Nepo, 2017). Such data are in agreement with previous research that showed that special education teachers had a high degree of motivation to apply AT (Nam et al., 2013; Nordström et al., 2018).

The predictors of a higher degree of motivation of special education teachers to use AT are the length of time needed to master the use of AT devices (Siyam, 2019), the perception of special education teachers about the usefulness of AT devices in working with students with ID (Adebisi et al., 2015; Meiland et al., 2017), but also access to an AT device in a school or institution where special education teachers are employed (Okongo et al., 2015; Siyan, 2019).

However, one of the most prominent predictors of a high degree of motivation of special education teachers for the use of AT was the younger biological age of persons with ID with whom special education teachers work (Schwartz et al., 2021). Seeing the progress in the development of various skills in children with ID, special education teachers develop motivation for further work (Coldwell, 2017; Lindeblad et al., 2017; Wehmeyer et al., 2017). However, the enthusiasm that any form of AT can alleviate ID deficits decreases with the increase in the biological age of persons with ID. If special education teachers see the results of their work and the positive effects that the use of AT has on people with ID, as well as the consequent improvement of their quality of life



and the development of new skills (Stanković, 2015; Zapf et al., 2016), they will be more motivated to use AT in the future.

## **4 Discussion**

A review of the literature found that special education teachers generally have positive attitudes toward the use of AT in teaching (Atanga et al., 2020; Onivehu et al., 2017; Siyam, 2019), and that the most significant predictors of positive attitudes are the level of special education teachers' knowledge of how to use them in teaching, the ease of using a certain device (Alkahtani, 2013; Teo et al., 2016; Yeşilyurt et al., 2016), while the results are not consistent when it comes to the type of school where special education teachers work, gender, years of work experience, as well as the personal characteristics of the children they work with (Alanazi, 2019; Onivehu et al., 2017; Milojević, 2020; Song et al., 2019).

When it comes to the competency of special education teachers in the application of various AT devices in working with children with ID, research from the literature review indicates that special education teachers have insufficiently developed competencies in the area of application of various types of AT (Alkahtani, 2013; Alsolami, 2022; Atanga et al., 2020; Gustafson, 2006; Khalil & Hantira, 2022; Lahm & Niekels, 1999; Onivehu et al., 2017). The biggest predictors of a higher degree of competency were the frequent use of AT in working with people with ID and a younger biological age of the special education teacher (Arslan-Ari & Başer, 2022; Jones et al., 2019; Svensson et al., 2021), while gender and years of work experience did not prove to be predictors of competency in the application of AT (Arsenić et al., 2022; Daničić, 2021).

A review of the literature found that special education teachers have a high degree of motivation to implement AT (Nam et al., 2013; Nordström et al., 2018). The degree of motivation positively correlates with the perception of special education teachers about the usefulness of a particular device (Adebisi et al., 2015; Meiland et al., 2017), accessibility of AT devices, and ease of use (Okongo et al., 2015; Siyan, 2019), while it negatively correlates with by the biological age of the population of people with ID with whom they work (Coldwell, 2017; Lindeblad et al., 2017; Schwartz et al., 2021; Stanković, 2015; Zapf et al., 2016; Wehmeyer et al., 2017).

## 5 Conclusion

Based on the literature review, we can conclude that special education teachers are motivated to apply AT in teaching, and have positive attitudes toward its use, however, they do not possess sufficiently developed competencies for using AT.

Special education teachers who have more positive attitudes towards the use of AT in teaching have a higher degree of motivation to use AT (Brodwin et al., 2007; Cabero-Almenara et al., 2022; Orr, 2011). Also, special education teachers who display more positive attitudes towards the use of AT in teaching believe that they have more competence in the area of application of AT (Al-Dababneh & Al-Zboon, 2022; Wilson, 2014).

The presence of a positive attitude towards a phenomenon also implies a greater degree of motivation to apply it in everyday life and work (An, 2018). Due to all of the above, it is important to point out that, after the implementation of training that has a direct effect on increasing the competencies of special education teachers in the field of application of AT, the attitudes towards its use can improve, while also increasing the motivation of special education teachers to use it daily in teaching with people with ID (Aldehami, 2022; Khalil & Hantira, 2022).

## Conflict of interest statement

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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