

## **Effectiveness of Flipped Learning Program Enhancing the Knowledge of Evidence-based Practices among Teachers of Students with Intellectual Disabilities**

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### **Abstract**

This research aimed to investigate the effectiveness of the Flipped Learning Training Program to enhance the knowledge of evidence-based practices for teachers of students with intellectual disabilities. The one-group quasi-experimental approach and achievement scale were used, and the pre-, post- and follow-up measurements were applied to a sample of (30) teachers of students with intellectual disabilities. The results demonstrated the effectiveness of the training program, which improved knowledge of evidence-based practices among teachers of students with intellectual disabilities. The results indicated there were statistically significant differences ( $\alpha \leq 0.05$ ) between the mean scores of the research sample in the pre and post applications of the achievement scale for evidence-based practices through the use of video modeling, social stories, task analysis, and time delay in favor of the post application. There were also statistically significant differences ( $\alpha \leq 0.05$ ) between the mean scores of the research sample in the post and follow-up applications of the achievement scale for evidence-based practices through the use of video modeling, social stories, task analysis, and delay. The time schedule is in favor of the tracking application, which indicates the continuation of the long-term impact of the program.

**Keywords:** flipped learning, video modeling, social stories, task analysis, time delay

Every human society has people with disabilities, however, the difference lies in society's outlook and methods for accommodating and supporting individuals with disabilities. Due to their unique perspective on life, the impact, and the type of disability they have, these individuals need special attention and typically require interventions (Elshani et al., 2020). According to Suleiman (2020), people with disabilities need assistance to adapt to life circumstances, considering their disabilities. Educationally, there has been advancement in the instruction of students with intellectual disabilities. Westling and Fox (2009) report that before the mid-1900s, some societies believed that people with intellectual disabilities could not benefit from conventional education; therefore, they were isolated and denied learning opportunities.

A significant portion of the population of individuals with disabilities is comprised specifically of individuals with intellectual disabilities. These individuals often demonstrate below-average performance in academics compared to their typically functioning peers, indicating challenges related to cognitive functioning (Elshani et al., 2020). Additionally, these individuals often have difficulty relating to others socially, struggle with understanding conceptual and practical matters, and have challenges with adaptive behaviors (Taha, 2021). Therefore, it is important all these elements are included into the curriculum for individuals with disabilities to ensure they are learning proper strategies to learn, socialize and function in society. Given the evolving landscape of education, countries and institutions are committed to addressing the educational needs of these students. The instructional approaches for students with intellectual disabilities are continually being refined (Elshani et al., 2020). It is imperative educators and those trained

in special education are knowledgeable regarding the specific needs and proficiencies of individuals with intellectual disabilities (Abdel Fattah, 2015).

The educational outcomes of children with disabilities vary depending on the effectiveness of the methods employed by educators (Al-Hussein, 2017). These students often show a decline in performance. According to Al-Hussein (2017), many educators consistently utilize ineffective strategies, leading to minimal impact on students' performance. The ineffectiveness is grounded in their infrequent application of evidence-based practices (EBPs) and a preference for informal sources of information rather than research-informed methodologies (Green et al., 2020). According to research, educators and experts in the field of intellectual impairment lack a general understanding of how to apply evidence-based approaches. Specialists often lack the skills required to determine an effective methodology, to design custom training plans for students with autism spectrum disorder, to evaluate and monitor progress, or to overcome those obstacles in order to attain fulfillment and educate effectively (Alhossein, 2021; Al-Maliki, 2021; Hassan, 2019). Green (2020) asserted the lack of effective methods could be due to insufficient knowledge and use of evidence-based approaches. It is imperative educators apply evidence-based methods appropriately, as the effective implementation of these methods has been shown to increase achievement levels for children with impairments (Gaastra et al., 2020).

Flipped learning is one such research-based approach, which is effective for some students (El Miedany, 2019). This method involves students being introduced to their classroom materials prior to class, so they are already familiar with the information. With this approach, students can learn at their own pace, giving students more control over the material (El Miedany, 2019). Furthermore, teachers are able to implement a more personalized teaching approach, customizing their instruction to their students. Furthermore, the in-class activities in a flipped model integrate interaction and collaboration. This teaching style promotes social skills and provides a better learning environment for student or even for trainees. Flipped learning approach will be used in this study to enhance teachers' knowledge of evidence-based practices in special education field.

According to previous research, teachers must be familiar with techniques that have proven to be effective in educating students with special needs (Al-Hussein, 2017; Green, 2020). Alhossein(2021) confirmed Hassan's (2019) conclusion that educators and specialists do not have the knowledge to teach using scientific, evidence-based methods. Al-Maliki's (2021) study further corroborates this claim, establishing that even after training and learning methods, teachers only fully understand the importance of evidence-based educational and behavioral practices when teaching students with intellectual disabilities. Green et al. (2020) reported a disconcertingly low rate of evidence-based practice utilization among intellectual education instructors, emphasizing the urgency for improvement. Moreover, Dynia et al. (2020) stress the crucial role of evidence-based approaches in guiding special education instructors when teaching approaches to special needs learners.

### **Research Questions**

1. What is the effect of a training program based on flipped learning on improving teachers' knowledge about evidence-based practices for students with intellectual disabilities?
2. Is there a statistically significant difference at the 0.05 level between the average scores of teachers working with students with intellectual disabilities across the pre-, post-, and follow-up assessments of the achievement scale for evidence-based practices, favoring the post- and follow-up applications?

### **Research Hypotheses**

1. The pre- and post-application assessments of the achievement scale for evidence-based practices show statistically significant differences at the 0.05 level between the average scores of teachers working with students with intellectual disabilities, and higher scores favor the post-application.
2. There are significant differences in mean scores at the 0.05 level between teachers who work with students with intellectual disabilities in the achievement scale post- and follow-up application assessments for evidence-based practices, with higher scores favoring the follow-up application.

3. The average scores under the achievement scale for evidence-based practices are statistically significant at the 0.05 level among the different applications, with higher scores favoring the pre- and post-applications.

### **Literature Review**

Flipped learning is a teaching method that enables students to familiarize themselves with classroom material independently at their own pace and then come together to discuss their findings and learn new perspectives in the classroom (Tan, 2023). This pedagogy provides an inclusive, yet flexible and customizable approach, which can help promote critical thinking skills (Khasawneh, 2023). Teachers are able to use their classroom time most efficiently with the flipped learning model, as students have already been introduced to the material previously, so they are able to come alongside the learners to provide scaffolding and guided assistance to understand the material at a deeper level. This teaching method can also build trust and establish a stronger relationship between the teacher and the student, while promoting the use of modern technology (Alian, 2016). Furthermore, Amal (2019) showcases the successful implementation of flipped classroom strategies with different learner groups and proves their effectiveness and ability to adapt to various learning needs. Also, flipped learning is one practice trainers can rely on it to help teachers when training them because it gives them space to work as well outside of training time to raise their knowledge and abilities.

### **Evidence-based Practices in Saudi**

The situation with EBPs is also changing very fast. Al-Ali and Gaber (2023) highlight the transformative power of EBP training and how educators' attitudes towards teaching students with intellectual disability are influenced. Moreover, research supports Khasawneh's (2023) assertion that such an innovative training program helps teachers acquire adequate skills and knowledge. It is imperative training programs implementing EBPs take students with disabilities into consideration to ensure their needs are being addressed, so their learning environment is most effective for their specific needs (Algethami, 2022).

Alqahtani et al. (2022) listed inadequate training and resources as critical obstacles to EBP adoption. Furthermore, Goodarzi et al. (2021) highlight the importance of overcoming obstacles to EBP implementation through innovative approaches and interactive, active learning. Goodarzi et al. (2021) show active EBP training methods are more effective than passive ones and encourage involved training for educators to better understand how to implement these methods in practice with patients. Overall, these studies inform the notion that dynamic, engaging, and technologically enhanced training can indeed dramatically increase educators' mastery of EBP practices, which would, in turn, improve educational practices and results.

Al Anazi et al. (2022) stress the importance of developing favorable attitudes and sufficient knowledge among professionals to make the implementation of EBPs successful. This is also evident in the findings of Al-Ali and Gaber (2023), who point out that EBP training significantly impacts teachers' attitudes. Okumoto et al. (2018) also show how technology can aid learners in comprehending EBPs more effectively in a flipped classroom setting. Therefore, it is imperative training programs are comprehensive and available to all educators to ensure they are equipped with the skills and knowledge they need to effectively integrate EBPs into their classrooms (Al-Ali & Gaber, 2023; Al Anazi et al., 2022; Okumoto et al., 2018).

### **Specific Evidence-based Practices**

**Video modeling.** Is an effective teaching method, which utilizes video technology to model a targeted skill in order to enhance skills for students with intellectual disabilities (Park et al., 2018). Andrade (2018) provides valid arguments for why improving social and communicative skills is advantageous to these students. Okumoto et al. (2018) further corroborated how technology such as the "Response Collector," and video modeling, can be integrated to make a learning experience more dynamic and interactive. Al-Ali and Gaber (2023) also emphasized how these creative teaching methods, such as video modeling, affect teachers' attitudes and improve their quality of teaching. Together, this

evidence substantiates the assumption that video modeling is not just a teaching tool but also a framework of practical strategies that enhances learning for individuals with intellectual disabilities.

**Social stories.** are structured narratives created to enhance social understanding and behaviors among people, especially those with autism spectrum disorders (Chen et al., 2021). These stories, shining light on what will happen in certain situations and why, illustrate exactly how narrative helps teach something as complicated as social cues and behaviors. These stories can help individuals with disabilities by reducing unwanted stressors, such as anxiety, while improving their behaviors in a social settings (Al Anazi et al., 2022). Al-Ali and Gaber (2023) further support the efficacy of this approach by pointing out that understanding-based and individual teaching methods are essential for improving educational outcomes. The utilization of social stories can transform complicated social situations by simplifying these instances into understandable and relatable terms (Sever & Gürdoğan Bayir, 2022). Okumoto et al. (2018) further propose that integrating such approaches into technology-rich learning settings will increase the immersion level and effectiveness of the knowledge transfer.

**Task analysis.** is a strategic approach that fosters independence and entails helping students break down big tasks into smaller, more manageable parts so the learning does not seem as intense, especially among learners with intellectual disabilities (McConomy et al., 2021). As Al-Ali and Gaber (2023) revealed, this approach is straightforward and adaptable, as it helps students develop their life and vocational skills. This method breaks down skills when teaching complex subjects (Sever & Gürdoğan Bayir, 2022). Task analysis can help students acquire skills necessary for problem solving and critical thinking (Khasawneh, 2023). Task analysis, in addition to facilitating learning through meeting individual rates and styles of learning, ensures personalization of development support since teaching each process individually reinforces understanding as learners become confident in developing their knowledge and skills.

**Time delay.** Is a systematic teaching method that involves an intentional gap at the point where the prompt and anticipated answer is introduced and is designed to help students, particularly those with intellectual disabilities, acquire literacy skills and comprehend information (Browder et al., 2009). Utilizing time delay can help students formulate reactions independently, so that they are not dependent upon prompts (Alqahtani et al., 2022; Goodarzi et al., 2021). When teachers integrate both active and inactive teaching styles, students learn to problem solve on their own, which generates autonomy and helps students acquire critical thinking skills (Goodarzi et al., 2021).

### **Research Method**

The current research used the quasi-experimental method to explore the effectiveness of a training program based on the flipped learning strategy in developing knowledge of evidence-based practices among teachers of students with intellectual disabilities. Abu Al-Naga (2020) maintains in her study that the quasi-experimental method explores the relationship between two variables as they are in reality without controlling the variables. In this method, the researcher selects a purposive sample from the population in addition to controlling some variables. It is one of the most accurate methods used by researchers in psychological studies. It aims to establish a cause-and-effect relationship between independent and dependent variables. It seeks to interpret phenomena by collecting observations and testing a hypothesis by controlling variables except for one variable to identify its effect on other variables.

### **Research Population and Sample**

The research community consisted of teachers of students with intellectual disabilities, specifically teachers of students with intellectual disabilities in Special Education School in Sinad city. The research sample consisted of 30 teachers of students with intellectual disabilities.

### **Data Collection Stage**

International evaluation standards were reviewed related to the effectiveness of a training program based on the evidence-based flipped learning strategy. Data was then collected among teachers of students with intellectual disabilities.

**The Research Instrument**

To achieve the research aims and answer its questions, a questionnaire was developed to identify the effectiveness of the training program utilizing the flipped learning strategy. The goal was to develop knowledge regarding evidence-based practices among teachers of students with intellectual disabilities. The construction of the questionnaire was implemented in the following steps:

**The Construction of the Instrument**

The instrument was created to assess the effectiveness of the training program utilizing the flipped learning strategy to develop knowledge regarding evidence based practices by teachers of students with intellectual disabilities. Teachers’ utilization of four different evidence- based strategies were assessed with various items totaling 24, including their knowledge of video modeling (6 items), social stories (seven items), task analysis (five items) and time delay (six items).

**Research Procedures**

Initially, the questionnaire was generated to establish the effectiveness of the training program utilizing the flipped learning strategy in developing knowledge of evidence-based practices among teachers of students with intellectual disabilities. A task facilitation request form was then submitted to the appropriate schools requesting their consent. After they gave their consent, the questionnaire was distributed to the teachers of students with intellectual disabilities. The data was then collected and assessed and results were formulated and discussed.

**Validity and Reliability**

**Validity.** The questionnaire was validated by presenting it to several special education professors in Saudi Arabia. They were provided with the questionnaire along with the research aims and questions and were invited to evaluate the suitability of the questionnaire to achieve the research objectives. Based on the professors’ recommendations, some of the questionnaire items were modified. Furthermore, an item was added to the initial version consisting of 22 items, leaving the questionnaire with 24 items. The modifications were as follows:

Table 1  
*The Jury’s Feedback Regarding the Questionnaire*

No.	Dimension	No. of items before modification	No. of modified items	No. of deleted/added items	No. of items after modification
1	Knowledge of evidence-based practices (video modeling)	6	2	0	6
2	Knowledge of evidence-based practices (social stories)	6	1	1	7
3	Knowledge of evidence-based practices (task analysis)	6	1	1	5
4	Knowledge of evidence-based practices (time delay)	5	2	1	6

The questionnaire was designed with a five-point scale ranging from 5 “Strongly Agree” to 1 “Strongly Disagree.” The validity and reliability of the questionnaire were established using face validity and internal consistency.

To identify the level of participants’ agreement (low, moderate, high), the following equation was used: the highest value minus the lowest value divided by the number of the required agreement categories, i.e.,  $5 - 1 \div 3 = 1.33$ . Thus, an agreement from 1.99 to 2.33 was considered low, from 2.34 to 3.67 was moderate, and from 3.68 to 5.00 was high. To establish the construct validity of the

questionnaire, it was applied to a pilot sample of 21 teachers of students with intellectual disability. They were recruited from the city of Mecca, i.e., from outside the city of Sinad. Pearson correlation coefficients among items and their respective dimensions were then calculated. Tables 2–5 show these correlations.

Table 2  
*Correlations Among Items and the Total Score of the First Dimension*

No.	Item	Corr.	Sig.
1	I know how to apply the video modeling strategy	0.743	0.000
2	I take into account the characteristics of students with intellectual disabilities when using the video modeling strategy	0.566	0.007
3	I know how to use the video modeling strategy and combine it with other effective teaching methods	0.742	0.000
4	I know how to record a video and show it to students to teach a specific behavior or skill	0.856	0.000
5	I know how to constantly develop the video modeling strategy to meet the teaching objectives	0.821	0.000
6	I know how to evaluate students when using the video modeling strategy	0.816	0.000

Table 3  
*Correlations Among Items and the Total Score of the Second Dimension*

No.	Item	Corr.	Sig.
1	I know how to use the social stories strategy	0.542	0.011
2	I know the standards of constructing social stories before creating and using them with students with intellectual disabilities	0.806	0.000
3	I know how to use the social stories strategy and combine it with other effective teaching methods	0.758	0.000
4	I know how to design social stories and present them to students with intellectual disabilities to teach a specific behavior or skill	0.759	0.000
5	I know how to constantly develop the social stories strategy to meet the teaching objectives and the needs of students	0.609	0.003
6	I know the Comic Page Creator program, through which I can design social stories for students with intellectual disabilities	0.793	0.000
7	I know how to employ the social stories strategy by describing a social situation and its appropriate behaviors based on the needs of the students with intellectual disability	0.770	0.000

Table 4  
*Correlations Among Items and the Total Score of the Third Dimension*

No.	Item	Corr.	Sig.
1	I know how to apply the task analysis strategy by breaking the skill into small, teachable steps	0.923	0.000
2	I know how to use the task analysis strategy and combine it with other effective teaching methods	0.948	0.000
3	I know how to employ technology to use the task analysis strategy to teach a specific behavior or skill	0.934	0.000
4	I know to constantly develop the task analysis strategy to suit the teaching objectives	0.963	0.000
5	I know the procedures of the task analysis strategy to achieve desired objectives	0.958	0.000

Table 5  
*Correlations Among Items and the Total Score of the Fourth Dimension*

No.	Item	Corr.	Sig.
1	I know how to apply the time delay strategy in activities in which the children participate to allow them the opportunity to provide the response without the need for prompting	0.838	0.000
2	I know how to identify the characteristics of students with intellectual disabilities and the educational environment when using the time delay strategy	0.865	0.000
3	I know how to use the time delay strategy and combine it with other effective teaching methods	0.925	0.000
4	I know how to constantly develop the time delay strategy to suit the teaching objectives	0.954	0.000
5	I know constant and progressive time delay and how to apply them	0.882	0.000
6	I know the zero delay deadline used in the time delay strategy	0.871	0.000

The previous table shows the correlation coefficients among items of the first dimension (use of the video modeling strategy) and its total score. It is obvious that correlation coefficients ranged between 0.566 and 0.856, all significant at the 0.01 level. Thus, this dimension is quite valid.

Table 3 presents the correlation coefficients among items of the second dimension (use of the social stories strategy) and its total score. Correlation coefficients ranged between 0.542 and 0.806, all significant at the 0.01 level. Thus, this dimension is quite valid.

Table 4 presents the correlation coefficients among items of the third dimension (use of the task analysis strategy) and its total score. Correlation coefficients ranged between 0.923 and 0.963, all significant at the 0.01 level. Thus, this dimension is quite valid.

Table 5 displays the correlation coefficients among items of the third dimension (use of the time delay strategy) and its total score. Correlation coefficients ranged between 0.838 and 0.954, all significant at the 0.01 level. Thus, this dimension is quite valid.

*Construct Validity*

Construct validity is a measure establishing that the research instrument measures the intended construct. It shows the extent to which dimensions of the questionnaire correlate with its total score.

The previous table shows that all correlations among dimensions and the questionnaire’s total score are significant at the 0.01 level, indicating that the questionnaire is quite valid.

Table 6  
*Correlations Among Dimensions and the Questionnaire’s Total Score*

No.	Dimension	Corr.	Sig.
1	Knowledge of evidence-based practices (video modeling)	0.523	0.015
2	Knowledge of evidence-based practices (social stories)	0.539	0.012
3	Knowledge of evidence-based practices (task analysis)	0.797	0.000
4	Knowledge of evidence-based practices (time delay)	0.776	0.000

**Reliability.** Reliability means that the results obtained from the measure are stable, i.e., yielding the same results if it is re-applied to the same sample under the same conditions after an appropriate interval of time (Bashta&Bouamousha, 2020). The Cronbach Alpha measure of internal consistency test was used in this research to measure consistency in the participants’ responses to the questionnaire items.

The data in Table 7 indicates that the alpha estimates of internal consistency for all dimensions are high. The total score correlated significantly with the first dimension (video modeling,  $r = 0.850$ ), the second dimension (social stories,  $r = 0.708$ ), the third dimension (task analysis,  $r = 0.070$ ), and the fourth dimension (time delay,  $r = 0.943$ ). The reliability coefficient for the questionnaire as a whole is 0.900. All obtained coefficients are highly significant. It was also found that the correlation coefficients for all dimensions ranged between 0.523 and 0.797, which are highly significant.

Table 7  
*Cronbach’s Alpha Coefficients of the Questionnaire’s Reliability*

Dimension	No. of items	Alpha	Corr. dimensions and the total questionnaire
Knowledge of evidence-based practices (video modeling)	6	0.850	0.523
Knowledge of evidence-based practices (social stories)	7	0.807	0.539
Knowledge of evidence-based practices (task analysis)	5	0.070	0.797
Knowledge of evidence-based practices (time delay)	6	0.943	0.776
Total	24	0.900	-

**The training program based on the flipped learning strategy to develop knowledge of evidence-based practices among teachers of students with intellectual disabilities.**

**The Program Philosophy**

The educational philosophy of the proposed program that the researcher developed and implemented in Sinad City for Special Education emerged from the importance of using evidence-based practices with students with intellectual disabilities given the positive results they have on their learning. Effective use of teaching models promotes students’ learning. The educational philosophy also emerged from the importance of using the flipped learning strategy as an innovative teaching method based on employing modern technology in a way that allows the trainer to prepare the content of the program through video clips, audio files, presentations, and other media.



The program emphasized the need to enhance knowledge regarding evidence-based practices among teachers of students with intellectual disabilities. Undoubtedly, students with intellectual disabilities benefit from evidence-based teaching. It is the responsibility of the teacher to choose and use the most effective practices to promote those students' learning. Training teachers on a well-constructed program can enhance their knowledge of evidence-based practices, which in turn can increase the quality of teaching to develop academic, social and other skills of students with intellectual disabilities. The program aimed to develop teachers' knowledge of the most prominent evidence-based practices used with students with intellectual disabilities.

The program used one of most effective and recent methods of presentation, i.e., flipped learning which is based on blended learning applications. In this method of presentation, traditional teaching procedures are reversed. The program content is designed in the form of video lectures recorded with specialized programs. The video lectures are sent to trainees to watch before the implementation of the program. The actual training program time is spent in implementing interactive activities and discussions about practices and their practical application.

**The program's general aim.** The program aimed to use the flipped learning strategy to develop knowledge of evidence-based practices among teachers of students with intellectual disabilities.

**The program's objectives.** The primary objective was to develop teachers' knowledge of evidence-based practices using flipped learning in order to enhance students' critical thinking, communication and cooperation skills, while promoting autonomy. Another objective was to enhance teachers' knowledge regarding evidence-based practices, including video modeling, social stories, task analysis and time delay.

**The importance of the program.** The professional standards of the Council for Exceptional Children (CES) advocate for the effective use of evidence-based practices by all special education professionals for students with disabilities (Council for Extraordinary Children, 2009/2012). Therefore, it is imperative teachers are knowledgeable of these practices, the criteria used to establish them and how to effectively integrate them into their classrooms. The importance of professional development also illustrates the importance of this program, as educators need to be adequately trained to effectively teach students with disabilities, as mandated by The Individuals with Disabilities Education Act (IDEA). Finally, the importance of utilizing instructional technology, such as flipped learning, was also a contributing factor in determining the importance of the program.

**The program's target group.** The program targeted teachers of students with intellectual disabilities at Sinad City Special Education Center.

**Program duration.** The program was implemented over five days (five 5-hours sessions).

**Strategies used in the program.** Several strategies were used in the program, including flipped learning where students watch video lectures at their own pace prior to the implementation of the program. During program time, students are then able to interact, discuss, collaborate and cooperate with their educator and peers. Self-learning was another strategy implemented during this program, as students gain autonomy watching video lectures and learning independently. Active learning was also involved, as students are active participants in their learning, as they have the ability to interact in a cooperative way. Students are also involved in inquiry learning, as they are able to inquire about what they learned. This style of learning helps with the creation of critical thinking and problem-solving skills. Teamwork was another strategy employed, as students work in small groups to accomplish their tasks.

**The program procedures.** The first researcher carried out the following procedures

Table 8

*The Program Procedures*

Session	Title of the session	Aim and content	Duration
1	Warm-up Application of the pre-test Develop knowledge of evidence-based practices in	Creating a spirit of familiarity among teachers, administering the pre-test, and starting the training program with the concept of evidence-based practices and concepts	5 hours

general				
2	Evidence-based (social stories)	practices	By using the flipped learning strategy, the researcher created videos for practicing social stories and sent them to the participants before the time of presenting the program so that the program time can be used in discussions about the practice and answering questions related to the topic	5 hours
3	Evidence-based (video modeling)	practices	By using the flipped learning strategy, the researcher created videos for practicing video modeling and sent them to the participants before the time of presenting the program so that the program time can be used in discussions about the practice and answering questions related to the topic	5 hours
4	Evidence-based (task analysis)	practices	By using the flipped learning strategy, the researcher created videos for practicing task analysis and sent them to the participants before the time of presenting the program so that the program time can be used in discussions about the practice and answering questions related to the topic	5 hours
5	Evidence-based (time delay)	practices	By using the flipped learning strategy, the researcher created videos for practicing time delay and sent them to the participants before the time of presenting the program so that the program time can be used in discussions about the practice and answering questions related to the topic	5 hours

## Results

### First: Answering the Research Questions

*The first main question: What is the effectiveness of a training program based on flipped learning in developing knowledge of evidence-based practices among teachers of students with intellectual disabilities?*

To answer this question, means and standard deviations of the questionnaire measuring knowledge of evidence-based practices among teachers of students with intellectual disabilities were calculated.

Table 9 shows that means of the dimensions of the teachers' knowledge of evidence-based practices before the intervention ranged between 18.30 and 23.66. The teachers' knowledge of evidence-based practices (task analysis) achieved the highest mean ( $M = 23.66$ ), followed by knowledge of evidence-based practices (social stories) with a mean of 23.33, knowledge of evidence-based practices (video modeling)" with a mean of 23.20, and knowledge of evidence-based practices (time delay) with a mean of 18.30. The mean of the tool questionnaire was 85.36.

Table 9

*Means and Standard Deviations of the Participants' Responses to the Evidence-based Practices Questionnaire before the Intervention*

No.	Dimension	M	SD	Rank
1	Knowledge of evidence-based practices (video modeling)	23.20	5.26	3
2	Knowledge of evidence-based practices (social stories)	23.33	7.74	2
3	Knowledge of evidence-based practices (task analysis)	23.66	3.31	1
4	Knowledge of evidence-based practices (time delay)	18.30	7.92	4

5	Total	85.36	22.79	-
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Data in Table 10 reveals that means of the dimensions of the teachers' knowledge of evidence-based practices after the intervention ranged between 20.90 and 28.00. The teachers' knowledge of evidence-based practices (social stories) achieved the highest mean (M = 28.00), followed by knowledge of evidence-based practices (video modeling) with a mean of 25.60, knowledge of evidence-based practices (time delay) with a mean of 22.03, and knowledge of evidence-based practices (task analysis) with a mean of 20.90. The mean of the tool questionnaire was 96.53.

Table 10  
*Means and Standard Deviations of the Participants' Responses to the Evidence-based Practices Questionnaire after the Intervention*

No.	Dimension	M	SD	Rank
1	Knowledge of evidence-based practices (video modeling)	25.60	3.22	2
2	Knowledge of evidence-based practices (social stories)	28.00	3.38	1
3	Knowledge of evidence-based practices (task analysis)	20.90	4.92	4
4	Knowledge of evidence-based practices (time delay)	22.03	5.94	3
5	Total	96.53	10.04	-

Data in Table 11 shows that means of the teachers' responses to the teachers' knowledge of evidence-based practices follow-up questionnaire ranged between 20.53 and 31.93. The teachers' knowledge of evidence-based practices (social stories) achieved the highest mean (M = 31.93), followed by knowledge of evidence-based practices (video modeling) with a mean of 28.96, knowledge of evidence-based practices (time delay) with a mean of 27.60, and knowledge of evidence-based practices (task analysis) with a mean of 20.53. The mean of the tool questionnaire was 16.112.

Table 11  
*Means and Standard Deviations of the Participants' Responses to the Evidence-based Practices Follow-up Questionnaire*

No.	Dimension	M	SD	Rank
1	Knowledge of evidence-based practices (video modeling)	28.96	2.51	2
2	Knowledge of evidence-based practices (social stories)	31.93	5.23	1
3	Knowledge of evidence-based practices (task analysis)	20.53	3.97	4
4	Knowledge of evidence-based practices (time delay)	27.60	4.50	3
5	Total	112.16	15.22	-

*Answering the second research question: Are there statistically significant differences at the 0.05 level between the mean scores of teachers of students with intellectual disabilities in the pre-, post- and follow-up application of the questionnaire of evidence-based practices in favor of the post- and follow-up questionnaire?*

To answer this question, Kruskal-Wallis Test was used to determine the differences in the participants' performance on the pre-, post- and follow-up questionnaire.

Table 12 shows the results of the pre-, post- and follow-up tests applied to the experimental sample on the questionnaire of teachers' knowledge of evidence-based practices. There were differences in favor of the follow-up test with a mean rank of 67.42, followed by the post-test with a mean rank of 37.65, and the pre-test with a mean rank of 31.42. The test score was 32.650 with a significance level of 0.01.

Table 12

*Kruskal-Wallis Test for the Differences in the Participants' Performance on the Three Applications of the Questionnaire*

	The pre-test	The post-test	The follow-up test
Mean rank	31.42	37.65	67.42
Test sore	32.650		
Asymp. Sig.	0.000		
Sig.	0.01		

### Testing Research Hypotheses

*The first research hypothesis: There would be statistically significant differences ( $p = 0.05$ ) between the participants' mean scores on the pre- and post-applications of the questionnaire of evidence-based practices in favor of the post-application.*

Data in Table 13 reveals that there were significant differences ( $t = 2.36$ ,  $p = 0.05$ ) between the participants' performance on the pre- and post-application of the questionnaire of evidence-based practices in favor of the post application. Thus, the first research hypothesis was supported.

Table 13

*Differences Between the Participants' Performance on the Pre- and Post-application of the Questionnaire of Knowledge of Evidence-based Practices*

Variables	N	M	SD	t-value	Sig.
Results of the pre-test	30	85.36	22.79	2.360	0.05
Results of the post-test	30	96.53	10.04		

*The second research hypothesis: There would be statistically significant differences at the 0.05 level between the participants' mean scores on the post- and follow-up applications of the questionnaire of evidence-based practices in favor of the follow-up-application.*

Data in Table 14 shows that there were significant differences ( $t = 4.80$ ,  $p = 0.01$ ) between the participants' performance on the post- and follow-up application of the questionnaire of evidence-based practices in favor of the follow-up application. Thus, the second research hypothesis was supported.

Table 14

*Differences Between the Participants' Performance on the Post- and Follow-up Application of the Questionnaire of Knowledge of Evidence-based Practices*

Variables	N	M	SD	t-value	Sig.
Results of the pre-test	30	85.36	22.79	4.800	0.01
Results of the post-test	30	112.16	15.22		

### Discussion

*The discussion related to the first research question: What is the effectiveness of a training program based on flipped learning in developing knowledge of evidence-based practices among teachers of students with intellectual disabilities?*

The hypothesis for this question asserted there would be statistically significant differences ( $p = 0.05$ ) between the participants' mean scores on the pre- and post-applications of the questionnaire of evidence-based practices in favor of the post-application. The results of the current research revealed statistically significant differences in the teachers' knowledge of evidence-based practices (video modeling, social stories, task analysis, and time delay) in favor of the post- and follow-up application of the questionnaire. The total mean of the pre-application of the questionnaire was 85.36, while the total mean of the post-application 96.53. The mean of the follow-up application was 112.16. These results indicate a noticeable improvement in the participants' performance in favor of the post- and follow-up application. The first research hypothesis was therefore supported. This finding supports the effectiveness

of the training program based on flipped learning in developing knowledge of evidence-based practices among teachers of students with intellectual disabilities.

The researchers attribute this finding to teachers' desire to learn recent teaching methods, which facilitate the teaching of students with intellectual disability. This finding aligns with the study of Al-Maliki (2021), which concluded that exposure to training courses raises awareness of evidence-based practices among special education teachers. This allows students to better understand the lesson and delve into effective learning activities.

*The discussion related to the second research question: Are there statistically significant differences at the 0.05 level between the mean scores of teachers of students with intellectual disabilities in the pre-, post- and follow-up application of the questionnaire of evidence-based practices in favor of the post- and follow-up questionnaire?*

The second hypothesis asserted there would be statistically significant differences at the 0.05 level between the participants' mean scores on the post- and follow-up applications of the questionnaire of evidence-based practices in favor of the follow-up-application. The results of the current research revealed statistically significant differences in the teachers' knowledge of evidence-based practices in favor of the post- and follow-up application of the questionnaire. This reveals a long term impact of the proposed training on teachers' knowledge of evidence-based practices. This finding can be attributed to the use of flipped learning that might have had a positive impact on the training provided to the teachers. Another explanation is teachers' apparent motivation during the training sessions. They displayed high levels of motivation out of a desire to improve the quality of their teaching.

The finding is consistent with the studies of Al-Rahiliyya et al. (2018), Al-Hajri (2021), Rozinah and Md Osman (2014), Kim (2014), and De Los Arcos (2014), all of which reported the effectiveness of the flipped learning strategy in enhancing trainees' various skills. Previous studies also showed that employing open learning resources in flipped learning fosters learners' satisfaction, participation, and cooperation in managing learning (Al-Hajri 2021; Al-Rahiliyya et al., 2018). The flipped learning strategy provides the teacher with more time to interact with students and carry out thinking activities in class, instead of using lecturing as the sole teaching method. This strategy also has a noticeable impact on trainees' ability to self-learn. Furthermore, previous studies showed that employing open educational resources in flipped learning led to an increase in learners' satisfaction with the learning process, an increase in learners' participation in the learning process, and an increase in the rate of cooperation of colleagues in managing the learning process (Al-Hajri, 2021; Al-Rahiliyya et al., 2018). Finally, learners displayed low levels of stress in flipped classroom, which was apparent during the training sessions in the current study.

### **Recommendations**

This research substantiated the importance of teacher training utilizing flipped learning and evidence-based strategies to most effectively educate students with disabilities. In light of the findings of the current research, a number of recommendations can be offered. First, undergraduate students and pre-service teachers should be taught according to evidence-based practices and should be trained on how to use them in their teaching. Second, teacher preparation programs should integrate courses concerned with the theoretical aspects of evidence-based practices and courses providing educators with the opportunity to practice using evidence-based practices with students with disabilities. The tertiary recommendation is that schools or specialized centers should support teachers use of evidence-based practices. Fourth, evidence-based practices should be integrated into the curricula. Social workers in disability care institutions should also be trained on evidence based practices to use at their facilities, as well. Finally, more research should be done to confirm these findings with students with various and specific disabilities to see which evidence-based practices are most effective.

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