Macrothink Institute™

Journal of Studies in Education
ISSN 2162-6952
2018, Vol. 8, No. 1

Preservice Special Education Teachers' Levels of Knowledge of Behavior Modification Principles

Murad A. Al-Bustanji, Ph.D.
Assistant Professor of Special Education
Al – Hussein Bin Talal University

Hisham A. Almakanin, Ph.D.
Assistant Professor of Special Education
The Hashemite University

Mohammad Beirat, Ph.D.
Assistant Professor of Special Education
Al – Hussein Bin Talal University

Noor T. Al. Bdour, Ph.D.
Assistant Professor of Special Education
Al – Hussein Bin Talal University

Received: Nov. 13, 2017 Accepted: Jan. 7, 2018 Published: February 1, 2018

doi:10.5296/jse.v8i1.12343 URL: https://doi.org/10.5296/jse.v8i1.12343

Abstract

The current study investigated preservice special education teachers' levels of knowledge of fundamental principles of behavior modification (BM), and its connection with some variables. The study's sample was (171) preservice special education teacher. Researchers developed a (50) item instrument in order to assess participants' levels of knowledge. The instrument was found to be valid and reliable. Results indicate the preservice special education teachers' levels of knowledge of behavior modification fundamental principles were low, in general. Further, female participants were more knowledgeable than male ones.

Additionally, statistical significant differences were found between participant on university, GPA rating, and semester students have had taken BM course variables, while there were no statically significant differences were found on type of disability preservice teacher teaching variable.

Keywords: Preservice special education teachers, behavior modification, levels of knowledge, Jordan, special education.

Introduction

One of the most important and fundamental issues in the field of special education is the case of preparing and training of special education teachers; such training has great impact on teacher's ability in providing special educational and instructional services for those children. The importance of this issue emerged due to several factors that were emerged in the second half of the 20th century (Alrouson, 2013). Preservice special education preparation programs aim at providing those future teachers with theoretical knowledge and practical experiences that enable them to fulfill their future duties. However, there is a general agreement in the field of special education that preservice training is not a sufficient guarantee to provide future teachers with all needed knowledge and skills in order to be successful teachers; there is a huge gap between what is being taught and practice in the field. Thus, these programs relay heavily on field practicum/training that comes at the end of such programs and consider to be the most important (Alkhateeb & Alhadidi, 2009).

Due to this fact, many researchers presented increase interest in studying teacher's personal characteristics, knowledge, and skills required in order to prepare successful teacher. Since field training consider to be a crucial issue in preparing preservice teachers and educational reform, researchers concluded and presented several vital suggestions in order to develop these practical experiences that should have direct influence on teachers personal and professional growth. Not only field training experiences aim investigating preservice teachers' abilities and eligibility for future success, but also provide a further opportunity to learn new skills. A general agreement among many authorities that field training is the time where preservice teachers implement learned skills and learn new ones. Thus, special education preparation programs give a special attention to this training (Masoud, 2004).

The evidence suggests that teachers who master the fundamental knowledge and skills related to behavior modification strategies are those who are capable of supporting desirable or socially acceptable behaviors of their students with disabilities through implementing reinforcement properly and reducing undesirable or socially unacceptable behaviors through punishment and other reduction procedures. Further, behavior modification strategies play a major role in helping teachers in managing their classrooms and implementing instruction (Wood, 2006).

The need for behavior modification strategies become very important when working with students with disabilities. Those students may exhibit a variety of behavioral, social, and emotional problems, which may cause deterioration in the individual's level of disability (Richards, Brady, & Taylor, 2015; Snell &Brown, 2000). Several studies indicated clearly the effectiveness of BM strategies in improving students with disabilities levels on all domains: social, emotional, academic, and developmental. This improvement leads directly to positive effects on teachers, students, and the educational process, in general. Therefore, this has generated increased researchers' attention to BM in the field of special education, and made it an essential component in any teacher pre- on in-service preparation program (Hamill & Everington, 2002; Martin & Pear, 2007; Miltenberger, 2012). Researchers believe that implementing BM strategies are more useful than any other strategies in the educational field

(Tawney & Gast, 1984).

Due to the importance of BM, the current study aims at investigating preservice special education teacher' levels of knowledge of BM principles in the light of some variables. To the best of the authors knowledge, no study was found that have had investigated this topic among preservice special education teachers. Previous studies focused on inservice special education teachers. The results of this study should help in developing and improving special education teacher preparation programs.

Study Problem and Questions

Although many research studies have greatly contributed in developing and implementing practices in the field of special education, the connection between research and practice was-and yet still—weak. This fact has encouraged some authorities to describe it as total separation between the two; many has attributed this separation to both researchers and teachers. However, the fact is that many factors contribute to the lack of use of evidence-based practices in the field of special education (Vaughn, Klinger, &Hughes, 2000). Thus, the current study stresses the role of preservice special education practicum training and aims at connecting it to this study. This current study problem is to examine preservice special education teachers' knowledge of BM during their practicum training. The study questions are:

1. What are preservice special education teachers' levels of knowledge of BM fundamental principles?

2. Are there any statistical significant differences between participants' levels of knowledge of BM can be attributed to gender, university, GPA rating, semester students have had taken BM course, or type of disability preservice teachers teaching variables?

Previous Studies

Behavior Modification has gain researchers' attention in the field of special education because of its significant effects on improving children's behaviors through increasing desired behaviors and decreasing undesired behaviors. Further, BM has important implications in teaching strategies and techniques used with children with special needs despite of their disabilities (Alkhateeb, 2001; 2009; Alkhateeb, & Alhadidi, 2009).

In one of few studies found in the literature in respect to BM, Alzaraa (2012) investigated teachers of students of children with autism of levels of knowledge in respect of BM strategies. The strategies were used to increase desired behaviors and to decrease undesirable behaviors.The study's sample consisted of 58 male and female teachers. Results indicated that teachers were best knowledgeable about strategies of increasing desired behavior, followed by reducing undesired behavior strategies, and least BM theoretical principles. Additionally, results indicate that female teachers are more knowledgeable about BM than male teachers, whereas no differences were found that can be attributed to educational level nor years of experiences.

In another study aimed at surveying levels of knowledge of (139) special education and public education teachers, and counselors of BM Strategies to increase desired behaviors and

to decrease undesirable behaviors,Alayed and Abu Hawash (2011) found that there were low levels of BM strategies among this sample. Furthermore, special education teacher and counselors were more knowledgeable of BM strategies than public education teachers.

Shang (2008) compared Indonesian's principles and teachers' abilities dealing with behavior problems using BM strategies. Results indicated low levels of abilities among study participants, however, teachers possessed higher abilities using BM than principles do.

In Syria, Orabi (2007) evaluated teachers of children with autism knowledge about BM. Study finding suggested that teachers acquired the minimum levels of knowledge about BM. Additionally, Male teaches were more knowledgeable than female ones. Further findings suggested that teachers who have graduate degrees and those with lower years of experience were more knowledgeable about BM.

Alkhateeb (2005) investigated the effect of group training session of teachers with children with mental disability (intellectual disability) knowledge of BM strategies. Findings indicated that training session resulted in increasing this knowledge among teachers. Differences were found in favor of those with higher educational level, but no differences were found on gender and years of experiences variables. In another study, Alkhateeb (1993) examined teachers of children with mental retardation (intellectual disability) knowledge of BM principles. Results found that teachers did not possess an acceptable level of knowledge of BM principles, and there was no statistically significant differences among teachers due to qualification or teaching experience.

In another study, Whaley (2002) found that special education teachers and speech and language pathologist lack knowledge about modern strategies teaching and training children with autism, that include knowledge about BM strategies. The author suggested the need for training on such strategies.

In summary, previous studies indicate low, insufficient levels of knowledge bout BM strategies teaching children with and without disabilities among and between professionals serving these children. However, these studies surveyed special education teachers and other professionals who are in-service; none of these studies have investigated preservice teacher such knowledge. Consequently, the current study is targeting assessing preservice teachers'knowledge of BM strategies and its relation with some other related variables.

Methodology

Study Sample

The study sample was recruited from all public universities in Jordan; the sample consisted from all preservice special education teachers enrolled in these universities during the second semester of the academic year 2015/2016. The final sample comprised 171 preservice special education teachers that are doing their practicum class. Table 1 presents sample's demographic information in details. The demographic variable served as the study's independent variables.

Table 1. Sample's demographic information

Demographic variables		N	%
Gender	Male	32	18.7
	Female	139	81.3
University	The University of Jordan (JU)	20	11.7
	Al-Balqa (BAU)	21	12.3
	Mauta (MU)	22	12.9
	Tafela (TU)	31	18.1
	Al-Hussein (AHU)	31	18.1
	Hashemite (HU)	46	26.9
GPA Rating	Satisfactory	29	17
	Good	61	35.7
	Very Good	68	39.8
	Excellent	13	7.6
semester students have had taken BM course	One semester before practicum	24	14
	Two semesters before practicum	16	9.4
	Three semesters before practicum	64	37.4
	More than three semesters before practicum	67	39.2
Type of disability preservice teacher teaching	Mental disability	76	44.4
	Learning disability	76	44.4
	Other disabilities	19	11.1
Total		171	100

Instrumentation

In order to achieve this study's goal and answer its questions, the researchers developed an instrument following these steps:

1. The researchers conducted an extensive literature review of previous studies related to its goal such as (Alayed & Abu Hawash, 2015; Alkhateeb, 1993; Alzaraa, 2012; Orabi, 2007). Based in the literature review, the authors determined four basic dimensions, and each dimension consisted of several items related to its contents.

2. Then, the instrument was sent to several reviewers, experts in the field of BM and special education, in order to provide their feedback.

3. Modification were made based on the experts' notes. The final instrument comprised of 50 items included in four dimensions:

a. Fundamental principles (19 items),

b. Strategies to increase and teach desired behavior (12 items),

c. Strategies to decrease undesired behavior (14 items), and

d. Other BM strategies, such as classic and cognitive BM (5 items).

The final instrument was rereviewed by experts and was approved for this study goals. Further, experts were asked to indicate the minimum level of knowledge on each dimension. Table 2 presents minimum levels of knowledge on each dimension, and instrument total score.

Table 2. Minimum levels of knowledge about BM

Dimension	Criterion
Basic principles	11
Strategies to increase and teach desired behavior	7.5
Strategies to decrease undesired behavior	8.5
Other BM strategies (classic and cognitive)	3
Total instrument score	30

Next, reliability data was obtained through internal consistency measures, and calculating using Cronbach-Alpha equation. Overall reliability coefficient was (0.83), while dimensions reliability coefficients ranged between (0.71) and (0.81). the reliability values consider to be sufficient for this study's goals. Table 3 presents reliability coefficient values for the study's instrument.

Table 3. Reliability Coefficient Values

Dimension	Reliability Coefficient
Fundamental principles	0.81
Strategies to increase and teach desired behavior	0.74
Strategies to decrease undesired behavior	0.76
Other BM strategies (classic and cognitive)	0.71
Overall	0.83

Then, the study's instrument was sent to each participant, where paper a based version of the study's instrument was used. A group of research assistants distributed and collected the data.The instrument included a cover page appreciating participants' response, providing response instructions, and ensuring their confidentiality. One degree was giving for each correct response (each item). The maximum possible score on the instrument is 50 (out of 50 items). After one month of collecting responses, authors entered responses into computer, and proper statistical procedures were utilized to answer the study's questions.

Results and Discussion

The first question was:" What are preservice special education teachers' levels of knowledge of BM fundamental principles?" to answer this question, means and standard deviations were calculated, and (t) scores. Table 4 presents means, standards deviations, and (t) scores for each dimension and overall instrument.

Table 4. Instrument and dimensions Means, SD, criterion, and (*t*) scores

Dimension	M	SD	Criterion	*t*	Sig.
Fundamental principles	10.74	2.36	11	-1.423	0.157
Strategies to increase and teach desired behavior	7.72	1.97	7.5	1.457	0.147
Strategies to decrease undesired behavior	6.51	2.20	8.5	-11.802*	0.000
Other BM strategies (classic and cognitive)	2.37	1.17	3	-6.974*	0.000
Overall	27.35	5.18	30	-6.694*	0.000

**Sig. at α = 0.05*

Table 4 indicates that participants' knowledge of BM strategies to increase and teach desired behavior (*m* = 7.72, criterion 7.5) was the best, comparing to the preset criterion. However, (*t*) values indicate no significant difference. Preservice teachers were next best knowledgeable about the fundamental principles of BM, where (m = 10.74) and criterion is (11). Results indicate that preservice teachers' knowledge of BM fundamental principles and it strategies to increase and teach desired behavior are in its medium levels.

As of the third dimension (strategies to increase desired behavior), and the fourth dimension (Other strategies in BM), preservice special education teachers' knowledge of these strategies was quite low and far under the desired level (*m* = 6.51 and criterion = 8.5, *m* = 2.37 and criterion = 3, respectivly; both were statistically significant different).

The table indicate, also, that preservice special education overall levels of knowledge in respect to BM strategies were lower than the preset criterion (30); participants' mean scores were (27.35), and it was statistically significant different (*t*= 6.694 at α = 0.000). this finding suggest that preservice teachers are lacking the fundamental knowledge and training on BM principles and different strategies.

These findings are very consistent with some previous studies findings, such as Alayed and Abu Hawash (2011), Al Hadidi (1990), Alkhateeb (2007), Alzaraa (2012), Haroon (1993), Orabi (2007), Shang (2008), and Whaley (2002). Researchers suggest that these finding are due to the lack of courses teaching BM principles and strategies in the different Jordanian universities. Further, preservice special education teachers lack the proper experiences practicing these strategies; it is clear that these trainees are far better in theoretical principles than practical ones.

The study's second quest was: "Are there any statistical significant differences between participants' levels of knowledge of BM can be attributed to gender, university, GPA, semester students have had taken BM course, or type of disability preservice teachers teaching variables?". Independent samples (t) test was used to examine mean differences between male and female preservice teachers, and One-Way ANOVA to examine differences of other study's variables.

Table 5 indicates that female reservice special education teachers were better knowledgeable about overall BM principles and strategies (*m* = 27.87) than male preservice special education

teachers (m = 25.09). this difference in means was statistically significant (t = 2.791, α = 0.006). Additionally, Female special education teachers were more knowledgeable than male ones in "fundamental principles" and "Strategies to increase and teach desired behavior." However, there were no statistically significant differences found between male and female preservice special education teachers on "Strategies to decrease undesired behavior" and "Other strategies in BM (classic and cognitive)." Current findings are consistent with (Alzaraa,2012), whereas they contradict with (Orabi, 2007) study findings. The authors attribute female better knowledge of BM fundamental principles and strategies to the better females' interest in the field of education. Further, familial and societal nurturing in Jordan and the Arab world pays a special attention to females in raising and nurturing their children, which makes females more interested in knowing and practicing such strategies.

Table 5. Independent Samples (t) test results of male and female preservice special education teachers

Dimension	Gender	m	t	Sig.
Fundamental principles	Male	9.94	-2.159*	0.032
	Female	10.93		
Strategies to increase and teach desired behavior	Male	6.94	-2.532*	0.012
	Female	7.90		
Strategies to decrease undesired behavior	Male	6.19	-0.933	0.352
	Female	6.59		
Other BM strategies (classic and cognitive)	Male	2.03	-1.847	0.066
	Female	2.45		
Overall	Male	25.09	-2.791*	0.006
	Female	27.87		

** significant at α = 0.05*

Results indicate significant statistical differences of preservice special education overall levels of knowledge of BM on university variable (t = 17.771, α = 0.000). to determine the source of these difference, Scheffé's test was used, which indicate that differences do exist between the JU students' (m = 30.70), MU students (m =21.59), TU students (m = 25.48), and AHU students (m = 26.32), in favor of JU students. Further, BAU students were more knowledgeable (m = 31.90) than MU (m = 21.59), TU students (m = 25.48), and AHU students (m = 26.32). Finally, results indicate that MU students' levels of knowledge of overall BM principles and strategies (m = 21.59) were significantly lower than both of AHU students (m = 26.32) and HU students (m = 28.52), making AHU and HU students more knowledgeable of BM.

Further, Table 6 suggests statistical significant differences on preservice special education levels of knowledge of BM fundamental principles on university variable (t = 9.780, α = 0.000). Scheffé's post hoc indicates significant differences between JU students (m = 11.90) and MU students (m = 8.32); JU students were more knowledgeable of BM fundamental principles. Additionally, BAU students have better knowledge of BM principles (m = 12.24) than MU (m

= 8.32) and TU (*m* = 10.23). further, MU students were less knowledge (*m* = 8.32) than AHU students (*m* = 10.77) and HU students (*m* = 11.02).

Statistical significant differences were found on preservice special education teachers levels of knowledge of "strategies to increase and teach desired behavior" (*t* = 8.184, α = 0.000). Scheffé's post hoc test indicates that JU students were more knowledgeable (*m* = 8.25) of these strategies than MU Students ((*m* = 6.05). moreover, BAU students were more knowledgeable ((*m* = 8.86) of these strategies than MU students (*m* = 6.05) and TU students (*m* = 7.00). finally, the HU students were more knowledgeable (*m* = 8.37) of increasing and teaching desirable behavior strategies than MU students (*m* = 6.05).

As table 6 indicates, statistical significant differences were found on level of knowledge of "strategies to decrease undesired behavior" on this variable (*t* = 7.016, α = 0.000). Scheffé's post hoc procedure indicates that JU students were more knowledgeable of these strategies (*m* = 8.05) than MU students (*m* = 5.05), TU students (*m* = 6.00), and AHU students (*m* = 5.87). additionally, BAU students were more knowledgeable (*m* = 7.57) than MU students (*m* = 5.05), and HU (*m* = 6.85) than MU students (*m* = 5.05).

Nevertheless, the table indicate significant differences between preservice special education teachers' levels of knowledge on "Other strategies in BM (classic and cognitive)" (*t* = 2.961, α = 0.014). Scheffé's post hoc test indicates that BAU students were more knowledgeable (*m* = 3.24) than AHU students of these strategies.

Table 6. One-Way ANOVA results of university variable

Dimension	Source	*df*	Mean square	*F*	Sig.
Fundamental principles	Between groups	5	217.329	*9.780	0.000
	Within groups	165	733.349		
Strategies to increase and teach desired behavior	Between groups	5	130.856	*8.184	0.000
	Within groups	165	527.671		
Strategies to decrease undesired behavior	Between groups	5	144.247	*7.016	0.000
	Within groups	165	678.466		
Other BM strategies (classic and cognitive)	Between groups	5	19.269	*2.961	0.014
	Within groups	165	214.778		
Overall	Between groups	5	1593.625	*17.771	0.000
	Within groups	165	2959.322		

** significant at α = 0.05*

The researchers believed that these differences of levels of knowledge of BM principles and strategies among and between preservice special education teachers enrolled in different universities to different students' levels prior to their enrollment in these universities. Based on information by the governmental high education council in Jordan, The students with the highest GBA's in high school certificates usually enroll in the universities that are located in

central part of Jordan that are JU, HU, and BAU (The High Education Council, 2017). Those students' levels of knowledge were higher than their colleagues enrolled in the southern universities that are MU, TU, and AHU (The High Education Council, 2017)

Table 7 shows One-Way ANOVA results of GPA rating variable. Preservice special education teachers' levels of knowledge of overall BM principles and strategies differed on GPA variable (t = 12.052, α = 0.000). Scheffé's post hoc indicates that those with satisfactory GPA (m = 24.45) and good GPA (m = 26.03) were less knowledgeable of BM principles and strategies than those with very good and excellent GPA (m = 28.84 and m = 32.23. respectively).

Furthermore, One-Way ANOVA results indicate statistical significant differences among and between preservice special education teachers' levels of knowledge of fundamental BM principles on GPA variable (t = 4.272, α = 0.006). Again, Scheffé's post hoc results indicate that those preservice teachers with excellent GPA rating were more knowledgeable of BM fundamental principles than those with good GPA rating.

Additionally, results indicate statistical significant differences in preservice special education teachers' levels of knowledge of BM strategies to increase and teach desired behavior on GPA variable (t = 10.387, α = 0.000). Scheffé'spost hoc results indicate that those with satisfactory GPA rating were less knowledgeable of BM strategies to increase and teach desire behaviors (m = 6.59) than those with very good and excellent GPA ratings (m = 8.47 and m = 8.69, respectively). Moreover, those with very good GPA rating were more knowledgeable of those strategies (m = 8.47) than those with good GPA rating (m = 7.21).

Results indicate statistical significant differences in preservice special education teachers' levels of knowledge of BM strategies to decrease undesired behavior on GPA variable (t = 4.974, α = 0.002). Scheffé's results indicate that those preservice special education teachers with very good and excellent GPA rating were more knowledgeable of those strategies (m = 6.99 and m = 7.69, respectively) than those with satisfactory GPA rating (m = 5.52).

Further, results indicate statistical significant differences in preservice special education teachers' levels of knowledge of other BM strategies (classic and cognitive) on GPA variable (t = 5.260, α = 0.002). Results of Scheffé's post hoc test revealed that those with excellent GPA rating (m = 3.46) were more knowledgeable of these strategies than those with very good (m = 2.28), good (m = 2.43), and satisfactory (m = 2.00) GPA rating.

Current findings are logical; students with higher academic performance are those with more knowledge and skills, and thus, are more knowledgeable of these strategies. Additionally, Orabi (2007) found that teachers whom are pursuing their graduate studies are more knowledgeable of these skills; usually those with higher GPA rating are the ones who enrolled in graduate studies.

Table 7. One-Way ANOVA results of GPA rating variable

Dimension	Source	*df*	Mean square	*F*	Sig.
Fundamental principles	Between groups	3	67.754	*4.272	0.006
	Within groups	167	882.924		
Strategies to increase and teach desired behavior	Between groups	3	103.552	*10.387	0.000
	Within groups	167	554.974		
Strategies to decrease undesired behavior	Between groups	3	67.488	*4.974	0.002
	Within groups	167	755.225		
Other BM strategies (classic and cognitive)	Between groups	3	20.207	*5.260	0.002
	Within groups	167	213.840		
Overall	Between groups	3	810.312	*12.052	0.000
	Within groups	167	2959.322		

** significant at α = 0.05*

Findings in table 8 indicate statistical significant differences among and between preservice special education teachers' levels of knowledge of overall BM principles and strategies on semester students have had taken BM course variable (t = 8.323, α = 0.000). consequently, Scheffé's post hoc was used to examine source of these differences. Results found that those students have had taken BM course before more than three semesters before doing their practicum training were more knowledgeable (m = 29.49) of BM than those who had taken this course one semester or three semesters before doing their practicum training (m = 24.33 and m = 26.56, respectively).

Consequently, significant statistical differences were revealed among and between participants' levels of knowledge of fundamental BM principles on semester students have had taken BM course variable (t = 3.326, α = 0.021). again, Scheffé's post hoc was utilized and found that participants who had had taken BM course more than three semesters before doing practicum (m = 11.36) were more knowledgeable of BM fundamental principle than those who had taken it two semesters before practicum (m = 9.81).

Significant statistical differences were found among and between participants' levels of knowledge of BM strategies to increase and teach desired behavior on semester students have had taken BM course variable (t = 8.877, α = 0.000). Scheffé's post hoc found that participants who had taken BM course more than three semesters before doing their practicum (m = 8.49) were more knowledgeable than those who had taken it one or three semesters before doing practicum (m = 6.33 and m = 7.47).

Significant statistical differences were found in participants' levels of knowledge of BM strategies to decrease undesired behavior on semester students have had taken BM course variable ($t = 2.701$, $\alpha = 0.047$). Scheffé's post hoc indicates that participants who had taken BM course more than three semesters before doing their practicum (m = 7.06) were more knowledgeable than those who had taken it one semesters before doing their practicum (m = 5.75).

Current findings can be attributed to the fact that students who had taken BM course three semesters before doing their practicum have the opportunity to connect BM fundamental principles and strategies to other courses, which have had enabled them to better understand and practice BM strategies with conjunction with other special education competencies.

Table 8. One-Way ANOVA results of semester students have had taken BM course variable

Dimension	Source	*df*	Mean square	*F*	Sig.
Fundamental principles	Between groups	3	53.604	*3.326	0.021
	Within groups	167	897.075		
Strategies to increase and teach desired behavior	Between groups	3	90.572	*8.877	0.000
	Within groups	167	567.955		
Strategies to decrease undesired behavior	Between groups	3	38.077	*2.701	0.047
	Within groups	167	784.636		
Other BM strategies (classic and cognitive)	Between groups	3	5.139	1.250	0.293
	Within groups	167	228.908		
Overall	Between groups	3	592.180	*8.323	0.000
	Within groups	167	3960.767		

** significant at α = 0.05*

Table 9 indicate no statistical significant differences among and between participants' levels of knowledge of BM fundamental principles and strategies on type of disability preservice teacher teaching. The authors attribute this to the fact that all preservice teachers have been exposed to the same theoretical background, relatively. Hence, the practical part of field training is insufficient to make significant differences among and between trainees. In other words, preservice special education teachers were coming form almost the same background, with very limited practical experiences, and were doing their practicum with the accordance to preset requirements that do not encourage any different implementation of BM strategies.

Table 9. One-Way ANOVA results of type of disability preservice teacher teaching variable

Dimension	Source	*df*	Mean square	*F*	Sig.
Fundamental principles	Between groups	2	23.586	2.137	0.121
	Within groups	168	927.092		
Strategies to increase and teach desired behavior	Between groups	2	14.066	1.833	0.163
	Within groups	168	644.461		
Strategies to decrease undesired behavior	Between groups	2	23.885	2.512	0.084
	Within groups	168	798.829		
Other BM strategies (classic and cognitive)	Between groups	2	1.323	0.478	0.621
	Within groups	168	232.724		
Overall	Between groups	2	146.579	2.794	0.064
	Within groups	168	4406.368		

** significant at α = 0.05*

Recommendations

Current results can be used to generate some specific recommendations to institutes and authorities related to preservice special education preparation programs. First, a special focus should be paid to the field of BM, theoretically and practicum, through increasing the number of courses, students have to take during their study program. Further, earlier practical experiences should be provided to those students, even before taking their practicum training. Second, preservice special education teachers should be exposed to BM in almost the very beginning for their preparation in order to provide them with every possible chance to communicate BM principles and strategies to other courses, which should result in better understanding and competences of BM.

Finally, universities, community colleges, and other institutions offering special education training programs are advised to pay a special attention to practicum training. These authorities should expand and enrich students' practical experiences through expanding practical requirements and field training.

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