

Abstract

Learning styles and multiple intelligences have been investigated in the last decades as important variables that impact the learning processes among students.

The present study hypothesizes that there will be a strong relationship between learning styles and their corresponding multiple intelligences among gifted and non-gifted students. This study aims to find parallels between the two concepts, learning styles and multiple intelligences, and on the other hand to emphasize the differences between them as two separate concepts. While trying to understand individual differences during the learning process, it became clear that information about general intelligence and personality give only a partial explanation. Learning styles and multiple intelligences contribute to a better understanding of the difference between individuals among the gifted and non-gifted in their process of learning. Learning style refers to an individual's natural, habitual, and preferred ways of absorbing, processing, and retaining new information and skills" (Reid, 1995). The term learning style was raised at the beginning of the 20th century and merged into many theories and models ever since then.

In this paper, we chose to focus on the model that was proposed by Dunn and Dunn (1993). This model categorizes humans learning process through four preferences: through visual, auditory, tactile and kinesthetic preferences.

It is important to distinguish between the concept "style" and close concepts such as: ability and strategy. These concepts have different meanings.

Abilities refer to competencies and they have specific definitions while styles refer to something more general.

The literature explains that the awareness to learning style is a part that benefits the learning processes among the students. Teaching classes in different learning styles will be significant for a wider range of students learning preferences. Studies that have been conducted among gifted and non-gifted students show that the exposure and the awareness to the different learning styles influence the learning process. Studies also presented gender and group as influential variables on learning styles.

The multiple theory of Gardner (1983) tries to expand the human potential and ability beyond the boundaries of general intelligence, which measures intelligence through the I.Q test. Gardner defines intelligence as ability or abilities that allows an individual to solve problems or produce products within a defined social structure. He claims that there are multiple intelligences which exist and they are independent; it opposes the notion of the existence of just general intelligence.

The multiple intelligences that are proposed by Gardner are: verbal, mathematical, logical, spatial, kinesthetic, musical, interpersonal, intrapersonal and natural intelligences.

According to Gardner's theory all intelligences have the same importance. In addition, each individual has a different level of multiple intelligences. Finally, each one of the intelligences has its own course of development.

The theory also relies on three basic principles: first, the intelligence is not only one entity. Moreover, multiple intelligences do not depend on each other and finally, there is interaction between the multiple intelligences. The theory of multiple intelligences and learning styles provide an equal educational opportunity for a range of learners with different and diverse styles and intelligences.

The main questions of the study are:

1. Are there differences between gifted and non-gifted students as related to learning style?
2. Are there differences between gifted and non-gifted students as related to Multiple Intelligence?
3. Is there a correlation between learning styles and multiple intelligences?

200 students participated in the study. Two groups of Israeli secondary school students, gifted and non-gifted students, took part in the study. Ages ranged from 12-16 years old. Data was collected on learning styles and multiple intelligences by two questionnaires, the Learning Style Inventory that was developed by Dunn and Dunn (1996) and the Multiple Intelligences Survey that was developed by Mackenzie (1999, 2002).

The findings present that there are differences in the preferences of learning styles between gifted and non-gifted students. The auditory, visual and tactile learning styles results presented differences in both groups while the

kinesthetic style results showed no significant statistical differences were found in both groups.

The results have shown significant differences between the gifted and the non-gifted as related to the tactile style; the non-gifted students prefer to use the tactile learning style more than the gifted students. This finding contradicts our hypothesis, that gifted student will present higher preference for using the tactile learning style. Price and Milgram (1993) studies reported that kinesthetic and tactile learning styles discriminated the most between gifted and non-gifted students, gifted students preferred kinesthetic and tactile more than non-gifted students because they like to be active participants in the discovery process in order to be motivated and engaged in class (Rohaizad, Yeop & Anuar, 2008). These differences of the results may be attributed to the changes that the educational system in Israel has been making in the methods of teaching at schools. This method believes that knowledge can be actively constructed by the students interaction with the world in different ways and encourages the student to engage in hands-on explorations such as: building models, doing experiments, and using technology that fuel the constructive learning process and make it meaningful for him (Papert, 1980). The findings also show that there are significant statistical differences in the tactile style due to the gender variable; and when we inquired the differences separately for the female and the male group, the results indicated that the gifted female group presents higher preferences in the use of tactile style than the gifted male group. This finding partially supports our hypotheses because when we focus on the gifted group, we found that the gifted females are more tactile than the gifted males. This result is similar with research findings (Alsafi, 2010), which also indicated that females demonstrated higher preference for tactile style than males.

Another difference that this study has indicated between gifted and non-gifted is related to visual learning style due to the interaction of age by gender factors. The differences in results in this style were in favor of the older female group rather than the younger female group. Wehrwein, Lujan & Dicarolo (2007) in their study proved that females present higher preference of the visual style. Ozbas (2014) in his study also proved that the most important difference is beneficial for the female group.

The results also report a significant difference between gifted and non-gifted as related to the auditory style due to the interaction of gender by group factors; the non-gifted male students preferred auditory style more than the gifted male group. This finding supports our hypothesis claiming that non-gifted students will present higher preferences for auditory learning styles than the gifted.

It can be concluded that there are significant differences among gifted and non-gifted as related to learning styles due to different factors. The innovation in my study is that the non-gifted students can also be characterized as tactile learners. In the light of the presented findings of the study, future studies should investigate more preferences of the tactile learning style among gifted and non-gifted.

The findings of the study also confirm that there is a direct correlation between different multiple intelligences and parallel learning styles. For instance, there is a significant correlation between spatial intelligence and the visual learning style and the bodily-kinesthetic intelligence strongly correlates with the kinesthetic learning style. This confirms our hypothesis which recognizes a clear correlation between the different multiple intelligences and the corresponded learning styles in both groups. The findings indicate that correlations do exist in the majority of the different learning styles and intelligences. These relationships might be set forth in the other way; that is to say, gifted students with a higher preference for auditory learning style seem to be stronger in all the intelligences and the non-gifted students with higher preference for auditory style seem to be stronger in linguistic, logical, kinesthetic, naturalistic and spatial intelligences.

These findings are similar to the results of the studies conducted by Seifoori & Zarei (2011) and Tekiner (2005). The results of these studies also indicate positive correlations between the learning styles with some of the intelligences.

The results obtained indicate that each participant uses a combination of different learning modalities to learn effectively. Students with dominant linguistic intelligence are more sensitive to spoken and written language, they possess the ability to learn languages easily, and use language to express oneself rhetorically or poetically; listen and respond, imitate sounds, read,

write and take part in discussions (Campbell, Campbell, & Dickinson, 1996). Therefore, the use of the different learning styles contributes to this intelligence. These results also conclude the idea articulated by Nolen (2003) that individuals possess intelligence to a certain level, but as a result of exposure to specific social and instructional conditions designed for a certain intelligence type; this intelligence type develops to a higher level. That is to say, one type of intelligence becomes stronger while others do not develop fully.

Gardner claimed that intelligence can function as a separate intellectual intelligence, he also pointed out an integral relationship between a certain intellectual ability to some other aspects of the intellect.

Gardner's theory (1995) also presents correlations between the intelligences. The fact that Gardner found relationships between different types of intelligences, explains the correlation between the learning styles and the intelligences. Thus, the auditory learning style positively correlates with the linguistic intelligence; it also serves as a resource to other intelligences as well. This explains the results of the present study.

In conclusion, the results of the hierarchical regression analysis report on a positive prediction of the auditory style by linguistic intelligence and a negative prediction of the visual style by musical intelligence. However, the findings indicate more predictions among the gifted group. This may suggest that among the gifted, intelligence has more impact on the learning style; the intelligences are more connected to the learning styles in the gifted group. The auditory style is predicted by intrapersonal and logical intelligences. The visual style is predicted by spatial intelligence and the tactile style is predicted by linguistic intelligence. The gifted are more focused and more attended to their intelligences and that is why it predicts their learning style, while the non-gifted are more diffused about their intelligences and that is why it does not predict their learning styles.

These findings have importance in the field of research and implementation. In the field of research, it is important to clarify that the assessment tools today are not enough to recognize the exact characteristics of learning styles and multiple intelligences among gifted and non-gifted. New self-report

questionnaires need to be developed that will allow more accurate identification of the components of the various learning styles and multiple intelligences. These questionnaires must include different assignments to investigate what learning styles must be utilized in order to accomplish the different assignments. This will predict the differences and the relationships between the two concepts and it also will be possible to make an accurate assessment of the task components according to different learning styles and multiple intelligences.

Future research should also integrate classroom observations and interviews with the students in a longitudinal study to have more valid results; that will allow more accurate identification.

In addition, this research should be carried out also among adults; the results may reveal more on the interactions and differences in gifted various non-gifted students.