The Debate Rages On: Learning Styles

Fact or Myth

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Abstract

The debate on the validity of teaching students how to identify their own preferred learning style is not going to go away anytime soon as evidenced by the number of articles still being written about the topic. One can find numerous research studies that say students have different strengths and weaknesses when it comes to learning and retaining information. These researchers theorize that one of the strategies that students can use in their studies to help them be more successful is to identify their preferred learning style. They go so far as to say that identifying learning styles is a valid source of information for learners that makes it easier for them to take in information. Of course, one can also find other studies that say the concept of learning styles is not valid and educators should stop perpetuating the myth that students have a dominant way that they learn. In light of the contradictory results, from these studies, it is hard to make an informed decision about the benefit of instructing students in how to identify their preferred way of taking in information. This report attempts to provide information to educators so that they can come to their own conclusion about the benefits of talking to their students about learning styles.

Teaching and learning are the hallmarks of education whether that learning is presented in a formal setting or an informal one. Instructors teach and students learn. That's the way it has always been. But, what has changed over the years are the strategies used in classrooms to help students learn what they are being taught. One of the strategies that has been around since the early 1920's (Gholami, & Bagheri, 2013) is the concept that each student has a preferred learning style that helps them process the information they are learning. Teachers have long promoted the benefits of getting students to understand their own dominant learning style by explaining to students that they all have their own strengths and weaknesses when it comes to learning. This was an accepted fact until researchers such as Pashler, McDaniel, Rohrer, and Bjork (2008) called into question the validity of taking up classroom time to discuss learning styles with students. They advanced the concept that there are more important learning strategies that instructors can use to help students succeed rather than tailoring instruction to varied learning styles. As can be seen from these examples, the researchers are clearly divided into two distinct factions which helps explain why the literature is either for the teaching of learning styles or against it as a waste of time.

The drawback with educators choosing sides, on any topic, is that it leads to acceptance rather than critical examination. It is the critical examination that more educators need to do if they are to come to their own decisions about topics such as learning styles. Another problem with discussing learning styles is that there are no clear cut right or wrong answers. There is an abundance of anecdotal evidence supporting the concept of learning styles which most researchers dismiss. I often wonder when the term anecdotal became synonymous with illogical reasoning as that appears to be the case now. It is worthwhile to remember that just because the information is limited to personal experience does not mean it does not have some validity.

The purpose of this article is not to write an exhaustive literature review of all the studies that have been written about learning styles. There are others who have completed literature reviews (Cassidy, 2004; Coffield, Moseley, Hall, & Ecclestone, 2004; Pashler, McDaniel, Rohrer, & Bjork, 2008) which can be accessed online. Instead, when beginning this report I attempted to discover what the literature said about learning styles and to analyze the information in as non-biased a fashion as possible. This proved more difficult than I imagined due to the dichotomy that exists within the literature on learning styles. As soon as people take sides it becomes a competition and competition implies that there will be a winner and a loser. I soon discovered, from reading the literature, that there are no winners and losers in any discussion of learning styles. For some reason, whenever educators get together to discuss topics in education they tend to pick sides and this serves to weaken the collaboration that is necessary to move forward on issues that directly affect our students and our own teaching pedagogy. When one is dogmatic it means that there is no room for compromise and the literature on learning styles is filled with people who are inflexible when it comes to this topic.

I admit that I thought reading and writing about learning styles would prove to be an easy task. Little did I know that the literature was fraught with landmines that threatened to blow up my existing ideas about what I thought about learning styles and their usefulness in the classroom. And, my research also led me down many rabbit holes that were easy to enter but difficult to climb out of thus contributing to my overall confusion. I discovered that learning styles research is not a cut and dry field. I have completed enough educational research to know that nothing about education is ever black and white and yet that is what most researchers on the topic of learning styles would have us believe. There are some researchers who are of the opinion that the concept of learning styles belongs with things like voodoo, magic, horoscopes,

myths, and urban legends. In other words, they are not to be believed. They lump these in with anecdotal evidence which is also not to be believed. These researchers would have us believe that the only evidence to be trusted is empirical evidence that can be proven scientifically but then tell us that there is no such evidence on learning styles. In other words, they do not believe in learning styles because it can't be proven that learning styles exist, or if they do, they do not help students to be more successful in their learning. I wanted, at various times, to throw my hands up and admit defeat. I walked away from the research several times but kept coming back to it because I couldn't stop thinking about it. I wanted desperately to get to the bottom of this concept, if there was a bottom. It turned out that yes, there was. It is not a pretty picture, nor is it one wrapped up in a bow. It just is and I found out that the researchers who believe in learning styles will never convince their colleagues that there is such a concept as learning styles and vice-versa. So, I had to ask myself what was the point. The point, it turns out, is that each instructor has to come to their own conclusion about the benefits of learning styles and I decided I wanted to help those who wanted to make up their own minds and not just accept what the research said or did not say. I told you it was complicated.

The plethora of articles does nothing to make the concept of learning styles clearer. It is as if each author worked totally in isolation without giving any thought to what others who came before them have said on the topic. Some authors may have cited others but for the most part they simply discounted anyone that did not agree with them and came up with their own thoughts on the topic. Then other authors ignored those writings and came up with their own thoughts. It continued like this through all of the articles. This is why the topic of learning styles is so confusing. No one is willing to listen to anyone else. I think they are afraid that someone will

tell them something they don't want to hear and that might confuse them and challenge their own assertions.

In a recent conversation with a colleague, about his course, he was telling me that he has stopped teaching about learning styles. He said that the concept of everyone having a preferred learning style was old outdated thinking, and that no one who was up to date on learning pedagogy still taught the concept of learning styles. He told me that the research did not support the idea that people have a specific learning style. He went on to say that this notion of everyone having a preferred way of taking in information had been debunked and therefore he was not going to waste anymore class time on teaching something that had been shown, in the research, to have no merit. I wasn't quite sure what to say because I still talk about learning styles in my classroom. As a matter of fact, when my students fill in their student evaluations at the end of term, one of the things they mention that really helped them in their studies was understanding what kind of a learner they were. As you can imagine, these two conflicting opinions led to some confusion on my part.

When I discuss learning styles, in my classroom, I tell my students that everyone has a preferred way of taking in information. I give the analogy of handedness. I tell them that each of us have a hand that we prefer to use whether that is the right or left hand. We are comfortable using that hand. It doesn't mean that we can't use the other hand, if we had to, it just means that we have trained ourselves to use that dominant hand. I know people who started out favouring their left hand but had been made to change to their right hand for reasons such as religious beliefs or culture. They learned to use the right hand even though they were born left-handed. It is the same with learning styles. We have one dominant style of learning that works better for us than another one. It doesn't mean that we can't take in information more than one way but the

one way, we identify, is the one that is the most efficient for us. I explain to my students the three most common types of learning styles: visual, auditory, and kinesthetic [VAK]. According to Gholami, and Bagheri (2013) the original VAK concept was developed by educational psychologists Fernald, Keller, Orton, Gillingham, Stillman, and Montessori starting in the 1920's. However, it was the work of Barbe, Swassing, and Milone, (1979) that popularized the three sensory learning modalities known as VAK.

It would be hard to find someone who did not agree that they use their senses when they process new information. I am no exception. For example, if I am driving I use my sense of sight to keep track of the traffic around me and of pedestrians, bicycle riders, skateboarders, and animals. I also have to use my sense of hearing because I need to listen for things such as police, fire, and ambulance sirens, and I need to listen for car horns that may warn me of danger. I use my sense of touch to hold the wheel of the car, to signal, to turn on the wipers, and to change channels on my car radio. In addition, I may use my sense of smell to detect carbon monoxide fumes in the car, or to smell any danger from outside the car such as a rabid skunk. I do not typically make use of my sense of taste when driving as licking the steering wheel will not help me drive more efficiently. Just like me, the majority of people make use of all of their dominant senses when doing anything. It is the same with learning in the classroom, students have to make use of their dominant senses when learning something new.

If one of our senses is compromised we adapt by using our other senses. For example, if we suffer from a cold and our ears are stuffed up we adapt by using more visual cues and rely less on our auditory sense. If we are having problems seeing, due to entering a dark room before our eyes adjust, we make use of our sense of hearing or our sense of touch. We adapt. If students are visual learners but their instructor does not use visual aids, students adapt. They

may read the textbook before class, they may formulate questions, or they may make their own visuals when taking notes. Students can learn how to adjust in our classrooms but they can't very well change their strategies if they don't first understand how they take in information. Without understanding how they best take in information, they can't adapt, and if they can't adapt they will find it difficult to learn. It is up to us to show them how to identify their preferred method of taking in information, and then provide them with strategies of how to modify their learning approach.

My students understand learning styles. They tell me that they can identify the type of learner they are after I have talked to them about the different learning styles in class. They inform me that understanding their learning style explains why they do the things they do when learning. Some students learn by reading the slides and writing notes, others learn by jotting down the main points but spend more time listening than writing, and some students need to be active while they are in class which means they move as they learn. This anecdotal evidence tells me that learning about learning styles is not outdated. This is one of the issues with trying to convince someone about the merits of learning styles. There is no empirical evidence that supports learning styles but there is plenty of personal experience as evidence.

Using personal experience as evidence is one of the criticisms that authors such as Newton (2015) level against anyone who purports to learn better following their preferred way of taking in information. Although, it is true that we can all learn using different modes of receiving information depending on what we are learning, it still remains a fact that most of us have one way that we like to learn. This does not preclude us from learning in different ways it just means we have to learn to adapt if we are not proficient in one way. Riener and Willingham (2010) despite insisting that learning styles do not exist concluded that college educators should

"continue to present information in the most appropriate manner for our content and for the level of prior knowledge, ability, and interests of that particular set of students" (p. 35). No one is suggesting that instructors change how they present information for their particular subject. It would be unprofessional to get students to use microscopes in a literature class or to not allow the use of calculators in a math class. However, this does not exclude us from making some adaptations for students based on their ability which the authors stipulate is an important factor in teaching decisions. I think the authors are not as opposed to learning styles as they think they are.

Let's now turn our attention to some of the issues that readers have with the research on learning styles.

There are no clear definitions

The lack of a clear definition was one of the major issues I found when reading articles about learning styles. It was difficult to compare articles and definitions as there was no one conceptual definition of what a learning style is. Without that clear operational definition there can be no comparison to results. Since each author or authors operate using their own definition of learning styles the matter becomes one of who has the right definition or even if there is such a thing as a right definition. Sharp, Bowker and Byrne (2008) attempt to explain the issue with definitions by stating there is a "staggeringly confusing array of models, theoretical frameworks, instruments, applications, interpretations, and claims pointing out that learning styles researchers are certainly not unified in all of their views" (p. 294). Similarly, DeBello (1990, as cited in Sharp, Bowker & Byrne, 2008) stated that there are "nearly as many definitions of learning styles as there are theorists" (p. 295). Cassidy (2004) concurs that "there exists a variety of

definitions, theoretical positions, models, interpretations, and measures of the construct [of learning styles]" (p. 420). He goes on to say

> Defining the key terms in this area is not a straightforward task. The terms "learning style", "cognitive style" and "learning strategy" are understandably frequently used imprecisely in theoretical and empirical accounts of the topic. The terms learning style and cognitive style are, on some occasions, used interchangeably, whilst at other times they are afforded separate and distinct definitions. (p. 420)

Pashler et al. (2008) in their article, say the term "learning styles refers to the concept that individuals differ in regard to what mode of instruction or study is most effective for them" (p. 105). Keefe (1982, as cited in Li et al., 2016) refers to learning styles as being "cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to [the] learning environment" (p. 90). Claxton and Ralston (1978, as cited in Husman & O'Loughlin, 2019) define learning style as "a student's consistent way of responding and using stimuli in the context of learning" (p. 6). Greenberg (2009) defined learning styles as "the ways in which each learner begins to concentrate on, process, absorb, and retain new information (p. 30). Felder and Spurlin (2005) stated that "students have different strengths and preferences in the ways they take in and process information – which is to say, they have different *learning* styles" (p. 103).

Each researcher, or group of researchers, has come up with their own categories and definitions of learning styles, however, what they do seem to each agree on is that learning style is the learner's preference for how they take in new information. This idea of putting the learner at the forefront of the definitions makes sense. And, this is what I noticed about the articles on learning styles. The authors, who oppose learning styles, have conveniently forgotten that it is

up to the learner to decide which way they learn best and that this is a personal decision based on their own strengths and weaknesses. Without the learners' input, researchers are missing a big piece of the puzzle that is known as learning styles.

What does the literature say about learning styles?

Before reading what the various authors say it is important to point out that the issue with the literature on learning styles is the deep chasm that exists among researchers relating to not only the benefit of learning styles but the very existence of learning styles. Many of the articles do not even reference other researchers who have carried out extensive research in the area. This lack of acknowledgment about what others have found leads to a one-sided approach. When research is conducted, without input from others in the field, it becomes one researcher arguing against another without any concrete understanding of what the other person has said about the topic. As mentioned, it also leads to a lack of clear definitions, a lack of conceptual frameworks, and a staggeringly diverse set of models and theories. This has served to make the research on learning styles weak which is one of the issues with trying to determine the feasibility of teaching about learning styles. When authors come up with their own learning style inventories, often without any research, or research with only small groups of students, others who read their work are understandably skeptical. In order to form any kind of consensus of how best to teach learning styles, or what learning style inventory to use, if any, there needs to be a concerted effort by educators from various fields to work together. In light of the fact that this debate has been ongoing for the past 100 years the chances of that happening are slim to none.

The majority of the articles on learning styles were written in the 1980's and 1990's with a few written in the early 2000's (Husman & O'Loughlin, 2019). The number of articles dropped off sharply after the early 2000's but picked up again in the past ten years (Akkoyuniu

& Soylu; Kirschner, 2016; Greenburg, 2009; Harr, Hall, Schoepp, & Smith, 2002; Husman & O'Loughlin, 2019; Li, Medwell, Wray, Wang, & Liu, 2016; Newton, 2015; Pashler et al., 2008; Reiner & Willingman, 2010; Tulbure, 2011) to name a few. This indicates that the debate on learning styles is not something that is going to go away any time soon.

Those who oppose learning styles tend to draw on the evidence presented by Coffield et al. (2004). However, in a careful reading of Coffield et al. (2004) one can see that the authors did not say that learning styles do not exist. In fact, they said that the idea that each of us have a preferred learning style is correct. They confirmed that "a discussion of learning styles may prove to be the catalyst for individual, organizational, or even systemic change" (p. 133). They went on to assert that

> sometimes a strategic approach is effective and students need to be able to judge when different approaches to learning are appropriate. The value judgements evident in various models need to be made more explicit if students are independently to evaluate the different approaches to learning styles. (p. 136)

In reality, their conclusions do not address the usefulness of teaching about learning styles and yet this is the conclusion many readers come to after reading their article. Coffield et al.`s reason for completing the literature review was to see if higher education institutions, in England, should purchase and use learning styles inventories. They reviewed multiple learning style inventories and came to the conclusion that they were not worth the money. That's what they looked at, learning style inventories not learning styles. They in no way posited the idea that learning styles were not sound pedagogically only that there were too many independent authors to come to a firm conclusion about which inventory was the most effective. In actuality, people who cite Coffield et al. as being against the idea of learning styles are in fact doing what the

authors warned against in their article which is only taking the parts of the review that they agree with. In addition, Felder and Spurlin (2005) admit that "students have different strengths and preferences in the ways they take in and process information – which is to say, they have different learning styles" (p. 103) which is not in direct opposition to Coffield et al.'s (2004) analysis as some authors would have us believe.

There is no connection between identifying learning style and academic achievement

This is one of the charges levelled against the idea of learning styles. Researchers say that there is no evidence that suggests students who know their preferred learning style perform better than students who do not know their learning style. When researchers such as Gappi (2013) tried to measure learning style with academic achievement they were disappointed to discover that students, who could identify their preferred learning style did not perform better than those who said they did not know their preferred learning style. Similarly, Riener and Willingham (2010) concluded that "students differ in their abilities, interests, and background knowledge but not in their learning styles. Students have preferences about how to learn, but no evidence suggests that catering to those preferences will lead to better learning" (p. 35). This apparently is enough for some people to say that this means that taking the time to help students identify learning styles is a waste of class time since it obviously makes no difference in academic achievement. What these researchers failed to take into consideration was how the students would have done if they did not know their preferred way of taking in information. And, another factor that the researchers did not consider is that just because the students did not identify a preferred learning style does not mean that they did not utilize one without realizing it.

Results are also contradictory. Kopsovich (2001) found significant relationships between students who were able to identify their preferred learning style and their academic success. In

addition, Gokalp (2013) investigated the relationship between identification of learning style and academic achievement. He found that there was a statistically significant difference between students who could identify their learning styles and their academic achievement. Newton (2015), in his research, found that "the overwhelming majority (89%) of recent research papers listed in ERIC [Educational Resources Information Center] and PubMed research databases, implicitly or directly endorse the use of Learning Styles in Higher Education" (p. 1). I know that just because the majority of people believe something does not make it right but it is worthwhile considering that if the majority of people believe something we should be looking at the results carefully and not just dismissing them because they go against what we think.

Akkoyunlu and Soylu (2008) indicated that educators have realized the importance of learning styles. They went on to say that educators noticed that students prefer different ways of taking in information. And, that students' learning styles affect performance in a learning environment. Kemp, Morrison, and Ross (1998, as cited in Akkoyunlu & Soylu, 2008) determined that "learning styles form a student's unique learning preference and help instructors in the planning of the learning/teaching environment" (p. 184). Similarly, Cassidy (2004) confirmed that "there is general acceptance that the manner in which individuals choose to or are inclined to approach a learning situation has an impact on performance and achievement of learning outcomes (p. 420). Sener and Cokcaliskan (2018) concurred by saying "exploring learning style and multiple intelligence type of learners can enable the students to identify their strengths and weaknesses and learn from them" (p. 125). Alkooheji and Al-Hattami (2018), in their discussion, indicated that "it has become obvious that there are learning styles preferences, and they are, to an extent, affected by age, gender, and college affiliation" (p. 56).

Thus, the research appears to support the notion that learners all have their own preferred way of taking in information and that this should not be discounted. There might not be direct evidence that identifying learning styles leads to academic achievement but there is also no evidence that it doesn't. There is also the misconception that learners know their preferred learning style. This is not correct. Unless students have been taught about learning styles and have the chance to discover how they best take in information they have no idea what a learning style is or what it means for them academically. Without this instruction most students would not be able to consciously identify their own learning style but this does not mean that they don't unconsciously use one method over another.

It is also important to understand that having students fill in learning styles inventories does not typically indicate to students their preferred way of taking in information due to the types of questions used in the inventories which are too vague to be helpful. The use of inventories is only one way to get students to start thinking about learning styles but it is not the most comprehensive. Learning about learning styles can best be accomplished in a classroom where the instructor explains the different styles and asks students to identify their own preferred learning style based on the information they hear in class and the discussion that follows that information.

There is no empirical evidence that learning styles exist

The problem, as I see it, is that researchers such as Riener and Willingham (2010) begin their discussion by stating "that there is no credible evidence that learning styles exist" (p. 33). This indicates a reluctance to accept anything that does not fit with their conclusion. They do go on to explain that they are not advocating that learners are all the same. What they are saying is that there is so much more to a learner than a specific learning style and they mention

characteristics such as “ability, background knowledge, [and] interest [that] vary from person to person and are known to affect learning” (p. 34). The authors suggest that these traits are often ignored when the emphasis is put on learning styles. They have a good point that there is more to a learner than their preferred learning style, however, I would argue that these are not discounted by those who believe that learners do have preferences for how they take in information. There is definitely more to a learner than their preferred learning style but knowing that does not mean that students cannot also learn about learning styles. The two are not mutually exclusive.

Researchers, such as Riener and Willingham (2010), who state that identifying a preferred learning style is not helpful when learning something new forget that most people do not understand their preferred way of taking in information until it is pointed out to them. We do many things everyday without thinking such as walking, eating, or driving a car. For example, once you know how to walk you do not have to think about all of the steps involved in walking. It is the same with learning. We use certain techniques that work for us without thought because they have become automatic. If one needs evidence to support this concept, just watch a child learn how to walk. First of all, they learn to pull themselves up to things like a sofa, then they practice letting go, and finally they put one foot in front of the other until they are walking. They fall down, a lot, but they never give up. It is the same with learning something new. We fail more than we succeed at first, but with practice we get better and better. There is no evidence that every person learns to walk the same way but that does not mean one way is right and another way is wrong. It is just different like learning styles are different.

When researchers insist on empirical evidence to prove concepts they are reducing the learning experience to something that can be easily measured. Learning is a messy undertaking

and I would suggest that how people learn cannot be measured by statistics or other measures that rely on validity and reliability. The difficulty with measuring learning styles is that researchers are attempting to prove the existence of learning styles using laboratory conditions that do not provide a true measure of what the learner does in any given learning situation. Also, there are many things that exist in the world that people accept without any proof by scientific measures. Remember the words of wisdom your mom and grandma passed down to you regarding life lessons. These had not been scientifically proven but yet made sense. These are often referred to as old wives' tales which by virtue of the name categorizes them with anecdotal evidence. These old wives' tales are always accepted with a sense of skepticism by scientific thinkers.

However, some of those old wives' tales turned out to be true scientifically. It has long been a belief that eating chicken soup, when you are sick, will help you feel better. It was considered a myth until a study by the American College of Chest Physicians (2000) showed that eating chicken soup can reduce inflammation by slowing down white blood cell activity responsible for causing inflammation. Does it make the old wives' tale truer now that there is scientific proof? No, it doesn't. It was always true just not accepted. Similarly the old wives' tale that eating an apple a day can keep the doctor away, is now supported by a study conducted in 2013 by Briggs, Mizdrak, and Scarborough that found eating an apple a day can prevent or delay heart attacks and strokes in people over 50. Again, is this more believable now that there is scientific evidence to support it? You can see the problem with waiting for scientific proof. Old wives' tales are based on anecdotal evidence and sometimes anecdotal evidence is just as valid as what science tells us. If we only believed something by waiting for proof that could be seen and measured we would not have the knowledge we have now especially in the field of

science. For example, just because we can't see something does not mean it is not there such as the atom. It is the smallest building block of matter but cannot be observed by the human eye. The human brain can be photographed but we cannot measure thoughts but that does not mean thoughts are not real. This is the problem with thinking that everything we believe has to be supported by empirical evidence. Sometimes it is just not measureable which does not make it incorrect or mean it is not present in the world.

There is also a danger in accepting only scientific evidence as true. Oftentimes science cannot explain something but that does not make it wrong. It just means that it can't be measured. How else can we explain doctors who ask patients if they have experienced any side effects from taking medication? They don't dismiss the patient's anecdotal evidence as wrong simply because that particular side effect hasn't been proven to exist. The self-reported data of the patient is just as valid as something that was studied in a laboratory setting. There are very few things that exist in the world that can be tested using rigorous scientific methods but that does not mean that they don't exist. However, even with these examples, it is still true that if a researcher bases their findings on anecdotal evidence they are often scorned by their more scientific colleagues.

Science also makes mistakes. I know that's hard to believe but if you think of all the things science has told us over the years you will see what I mean. For example, it has long been believed that drinking one or two alcoholic drinks a day would help heart health (Baum-Baicker, 1985). A new study by Millwood et al., (2019) calls into question that conclusion and now says that alcohol, even in moderation, can increase the risk of heart attacks and strokes. The original research, by Baum-Baicker (1985) stated that people who were moderate drinkers, classified as having a drink or two a day, were able to reduce their risk of stroke and heart problems. He

came to this conclusion after comparing the risks of developing heart problems between moderate drinkers and non-drinkers. The non-drinkers were shown to have a higher risk of heart disease. The research has since been shown to be flawed. The original researcher, failed to take into account the fact that the non-drinkers had other health problems that could have led to their increased risk of heart disease. Millwood et al., (2019) now point out that the previous studies had no serious scientific basis. This example shows that people who want to accept a conclusion will accept it without questioning the results. It is the same with learning styles. Those who do not want to accept that individuals have a preferred way of taking in information will only read those articles that state that learning styles are a myth, while those who accept the anecdotal evidence of learning styles will only read those articles. You can see the problem with empirical evidence. Researchers manipulate the data to serve their own purposes.

The validity of learning styles inventories

There is also an issue with the measurement of learning styles. In judging learning style inventories, authors such as Kirschner (2017) tried to quantify data by using the indices of internal consistency, test-retest reliability, construct validity, and predictive validity. These are all good measures for studies that rely on quantitative research based on specific numbers. The problem that many researchers fail to grasp is that just because something cannot be proven completely does not mean it is not true. It just means that the measures used are not conducive to the type of research conducted. This is why researchers that use qualitative data find more evidence for the validity of learning styles because they are not constrained by the rigid criteria of quantitative research.

One of the concerns raised by researchers such as Coffield et al. (2004), Newton (2015), and Pashler et al. (2008) is that the instruments that measure learning styles are not reliable

because they have not been tested for validity and are motivated by people who want to sell their learning styles inventories (e.g. Dunn, Dunn, & Price, 1997; Kolb, 1999, Myers-Briggs Type Indicator, 1985; Entwistle & Walker, 2000; Honey & Mumford, 1992). This is an assumption as no one can determine what the motivation is for the people who came up with their learning style inventories and even if one of their reasons was to sell them how does that discount the validity of the instrument.

The other issue is that there are too many classification for learning styles. Coffield et al. (2004) identified over 70 different classification systems. These methods of classifying learners is what has led to many researchers dismissing the idea of learning styles due to the multiple types of learning styles purported to exist. They maintain that there are just too many types and the types are too abstract to offer any concrete ways of informing educational practices. Also, individual learners do not fit neatly into one category but some authors cling to the notion that helping students identify their preferred learning style means they will be categorized and that instructors will not challenge them to learn in different ways (Pashler et al., 2008). Pashler et al. (2008) assume that this will lead to instructors limiting their teaching to only one style for each student. This is not feasible, nor desirable, as every individual is capable of using more than one learning style depending on what they are learning but that does not mean that they do not have a preferred way of taking in information. Fleming (2012) acknowledges that "adopting learning behaviors that are aligned with your preferences is more likely to lead to positive learning outcomes than adopting alternative strategies that are the opposite of your preferences" (p. 2).

Pashler et al. (2008) also state that "it is only natural and appealing to think that all people have the potential to learn effectively and easily if only instruction is tailored to their

individual learning styles" (p. 107). Are the authors expecting us to believe that not all people can learn? They go on to say that

> If a person or a person's child is not succeeding or excelling in school, it may be more comfortable for the person to think that the educational system, not the person or the child himself or herself, is responsible. That is, rather than attribute one's lack of success to any lack of ability or effort on one's part, it may be more appealing to think that the fault lies with instruction being inadequately tailored to one's learning style. (p. 108)

As an educator, this is a very disturbing thought. It is the responsibility of educators to find ways that all students can learn. It is easy to blame the learner rather than look to ourselves to find a solution for why our students fail to learn. This thinking that it is always someone else's fault for why our students are not doing well means that we have, in fact, given up. If an educator gives up on their students than it is no wonder students give up on their instructors. I understand that some students fail because they do not come to class or do not hand in assignments, however, by dismissing the fact that every learner takes in information in a preferred way should not absolve instructors of the need to try and adapt their teaching styles to cover as many learning styles as possible in their classrooms. This is one of the issues with dismissing learning styles out of hand without doing some soul searching of our own.

Pashler et al. (2008) further say that the only way they will accept the concept of learning styles is if there is "evidence for a learning style intervention [that] needs to consist of finding that a given student's learning is enhanced by instruction that is tailored in some way to that student's learning style" (p. 108). Pashler et al. will never find absolute proof that tailoring instruction to a specific student's preferred way of taking in information works but they also

cannot provide evidence that it doesn't help when instructors provide instruction in multiple modalities.

There is no evidence that indicates that instructors should tailor lessons to learning styles

Riener and Willingham (2010) said that it is a "waste of time to assess learning styles rather than, for instance, background knowledge" (p. 35). They state that assessing background knowledge, rather than learning styles, is much more useful since it is easier to plan a lesson taking into account what students already know about the topic. They insist that knowing how our students learn is not useful information. I would have to disagree with this statement. Yes, providing background knowledge, when teaching, is important but that does not mean that we have to sacrifice one for the other. Riener and Willingham want us to believe that we have to choose between teaching about learning styles or providing background information. It is possible to tailor instruction to more than one learning style and to also provide enough background knowledge so the students understand the topic. Just because we take the time to help students understand their learning style does not mean we won't have time to build background knowledge.

The other issue mentioned by Riener and Willingham (2010) is that teachers should not adapt their teaching style to match their students' learning styles. This is true. Just as students have a preferred way of taking in information, teachers also have a preferred way of teaching. In addition, teachers cannot possibly match every student's learning style but what they can do is adjust how they teach by using a multitude of different learning styles in their classrooms. An example would be using PowerPoint slides for the visual learner, explaining the concepts for the auditory learner, and showing students how to take notes for the kinesthetic learner. By making a few adjustments the instructor can reach more students and tap into their preferred way of

taking in information. Kirchner (2017) is adamant in his scorn for teaching learning styles by saying that students do not know what kind of style is pedagogically sound for different subjects. This may be true but it leads to the assumption that instructors are the only ones with the correct answer. This type of thinking permeates research on learning styles. How can one dismiss an individual's own preference without empirical evidence? Kirchner is guilty of doing the same thing he accuses other researchers of doing. That is coming to a conclusion without verifiable data.

Problems with Research

The first problem is that each researcher uses a different definition of learning styles and the second problem is that they are trying to make a connection between learning styles and academic achievement which is not viable. The issue with trying to connect learning styles and academic achievement is that there are too many factors that go into academic achievement. There is the motivation of the student, the interest in the topic, the instructor, the textbook being used, and the peers within each classroom. Any instructor will tell you that if they have a classroom with students who participate and are engaged with the material those students will learn more than if the classroom is filled with passive learners. Passive learners do not engage with the material and therefore make it almost impossible for the instructor to teach and for the students to learn.

Learning styles research deals with the habits and behaviours of learners only and not with their ability to learn information (Sharp, Bowker & Byrne, 2008). Sharp, Bowker and Byrne (2008) further explain that the research focuses primarily on how learners behave in certain situations rather than on how well they may complete the assignments within each

situation. This translates to how students think about the material, how they problem-solve, and how they remember the information. The habits and behaviours of students are not quantifiable.

Conclusion

In reviewing the literature for and against learning styles it appears that the divide is one that will never be resolved. The researchers who advocate for learning styles point out that anecdotal evidence exists that support their view that learners have a preference for taking in information and that it is based on the learners themselves. The researchers who oppose the notion of learning styles do so because there is no empirical evidence that students improve their learning based on learning styles. The problem with both approaches is that it is an all or nothing proposition. One is either for learning styles or one is against learning styles. As I have already pointed out this is the main issue in educational research. Researchers feel like they have to take sides. And, when one takes sides that means they have to discredit others who do not agree with them.

When researchers point out that there is no evidence that knowing their preferred way of taking in information is beneficial for students, they chose to ignore that there is also no evidence that understanding one's learning style will in some way damage the learner. Just as understanding that learner's prefer one dominant hand over the other does not mean that they need evidence to understand why they use their left hand over their right or vice-versa. Understanding that all learners can learn using various learning styles but that they prefer one over another does not mean that the learner cannot learn if the teacher does not modify their teaching. Therefore, having students understand they have one dominant method of learning does not in any way inhibit how they learn. In fact, the evidence supports the fact that learners do learn better when they are more comfortable with how the information is presented to them.

And, if instructors use various teaching modes to assist students with different learning styles what is the liability? There is no known detriment to students or instructors for having a discussion about learning styles. We should all be concerned with improving how all of our students learn and if talking to them about how they like to take in information helps with their ability to better understand themselves and how they learn than what is the harm? The answer is that there is none.

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