Is there a difference in learning styles of honors versus non-honors students as assessed by the GEFT?

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IS THERE A DIFFERENCE IN LEARNING STYLES OF HONORS VERSUS NON-HONORS STUDENTS AS ASSESSED BY THE GEFT?

by

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Education in the Department of Instructional Programs in the College of Education at the University of Central Florida Orlando, Florida

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Major Professor: Dr. Thomas Kubala
The goal of this research was to find if there was a discernable difference in the preferred learning style of an honors student versus a non-honors student based on the Group Embedded Figures Test. Although many instructors use the lecture method to teach, it may not be the most productive tool for students to learn. The information from this study could be of help when an instructor is preparing to instruct a group of students in an honors, AP (advanced placement) or gifted class as to determine what activities would provide the best retention of material.

The results of this study were analyzed to examine the variables of being an honors or non-honors student, gender, age, ethnicity, degree being pursued and being a full time or part time student. According to the Chi² analysis, it was found that there is no one learning style that is preferred by students who take honors classes versus other students. It was also discovered that gender, age, ethnicity, degree being pursued and being either a full time or part time student did not impact preferred learning style for the students on the East Campus of Valencia Community College.

Suggested use for this study would be to inform instructors and faculty that there is no one learning style preferred by the honors student. This information can not be reiterated enough to ensure that students are given many different types of opportunities to successfully accomplish their academic goals.
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CHAPTER ONE

INTRODUCTION

Instructors at every level of education are continually evaluating their teaching methodologies trying to find THE FORMULA that is going to enable them to teach their students to gain the greatest level of success they possibly can, not only in their educational pursuits but in life experiences as well. This FORMULA will allow all of their students to become successful. However, what every instructor realizes is that there are as many definitions of success as there are people, success can not be defined abstractly, it always occurs within a set range of standards developed by a culture or an individual. Honors and/or gifted students generally have better grades and higher scores on college entrance exams (Robinson & Jones, 1986). This is one definition of success in the academic culture of the United States. It is also very important that individual are able to recognize how they succeed and generalize that activity so that success comes more easily in the rest of their endeavors.

Educators have been interested in discovering how students who succeed, learn. Not all students are able to successfully process information because not all students succeed in the classroom environment. Parnell (1990), stated that the most important difference among learners is speed – there are fast learners and there are slow learners. John Watson in the 1920’s, John Dewey, Lev Vygotsky, and Jean Piaget in the 1930’s
and Jerome Bruner in the 1960's are just a few of the early educational researchers who were interested in the field of successful teaching and learning. What these researchers discovered is that one strategy does not work well in every context. Within the same classroom, widespread differences can exist between the students’ levels of abilities. A student may be highly successful in one class and fail at another. Highly successful individuals – as defined by our culture – are individuals who have figured out what they do well and can capitalize on that activity or pursuit (Blackburn & Erickson, 1986).

There are very few individuals who are equally good at everything. Students must discover what increases their success in the classroom and then begin working from that perspective as well as discovering their weaknesses and try to compensate for them. Students frequently adapt to an educational or social environment because they have discovered that adaptation can be the road of success in their pursuit of personal excellence. A study by Smith-Winberry and Tomlinson-Keasey (1982) showed that gifted/honors female students were better adjusted socially and academically than non-gifted female students.

However, a question that plagues many instructors is how to keep students who are quick to learn, interested in material in which they may have a fundamental understanding but haven’t yet mastered. These “quick to acquire knowledge” students may need to be challenged to “master” concepts and become skilled in the application of these ideas. According to Parnell (1990), there are no dumb students and there are no smart students, just students that acquire knowledge at different rates. Equally frustrating is the dilemma of keeping the rapt attention of “average” students in the classroom until
they can master the presented information and become comfortable with the application of that information. For many instructors, the use of lectures with the accompanying note taking by the student is the primary way to disseminate this important information. However, this may not be the most productive tool for students to master the material that they must learn. In fact, when student lecture notes are analyzed, it has been demonstrated that they record less than 50% of the critical ideas presented during a lecture (Hartley & Cameron, 1967; Kiewra, 1985a, 1985b). The academic career of most individuals includes numerous notebooks filled to capacity with copious notes taken during lectures. If the research (Kiewra, 1985c; Hartley, 1983; Howe, 1970) performed thus far is correct, these students are not acquiring the information that will be necessary to further enhance the desired career path. It should be the goal of instructors everywhere to provide all students with the tools that will enable them to become life-long and efficient learners.

The Research Problem

Since learning may either be enhanced or negated by activities presented in the classroom, the goal of this research was to determine how to increase the effectiveness of retention of all material discussed in the classroom setting. Specifically, this research addressed the differences in the learning styles of students enrolled in honors classes as opposed to non-honors classes. This information should be of great benefit to an instructor who is preparing a class aimed specifically at students in an “honors” or AP (advanced placement) type class in order to assist them in the learning and retention of
material. This group of students was targeted because they often have many unmet needs in the classroom. Many of these unmet needs are a result of the fallacies that abound regarding the honors and/or gifted student. These students are often seen as proficient learners and therefore do not need ancillary assistance in acquiring new information. For many honors and/or gifted students, their success is due not to brilliance but to perseverance (Harrigan, 1998). Many honors and/or gifted students attend every class meeting and are prepared for the topic of the day through the diligence of homework. These students set high standards for themselves and encourage other students to also set high standards (Randall & Copeland, Fall-Winter 1986-1987). Since most honors and/or gifted students take classes outside of the honors department, this means that the honors and/or gifted student is encouraging many other students in the college or university to work up to the potential that they might possess (Harrigan, 1998). Many instructors mistakenly expect these students to accommodate new information presented because they are quick to assimilate new information. However, the accommodation of new material may take time and practice. Instructors of honors and/or gifted students need to understand these requirements and be able to give these students the tools they require to accommodate this new material into their knowledge repertoire (Lovecky, 1986). It may be difficult to alter a learning style, but there are many strategies available to help with the learning and retention of difficult material. These are minor obstacles that can be overcome with planning and accommodations.

Many honors and/or gifted students also are involved in outside activities including campus organizations and political parties (Harrigan, 1998). This allows the
honors and/or gifted student to become knowledgeable in the social and political community thus affording this student an understanding of the ramifications of social involvement (Harrigan, 1998). Students who are involved in the community are often better students.

There are many myths about honor and/or gifted students that have contributed to the neglect of these students because they tend to have different needs in the classroom (Blackburn & Erickson, 1986). If the needs of the honors and/or gifted student are known, those needs could be met either in or out of the classroom environment and increase the likelihood of success for that student. For example, many honors and/or gifted students are likely to feel different in the classroom environment because they are interested in discovering all the information they can about a particular topic or subject (Blackburn & Erickson, 1986). Other students may become disinterested in the subject and be ready to begin another topic before the honors and/or gifted student has totally satisfied their curiosity. If these students could be grouped in some manner or characteristic, it would be easier to nurture common characteristics both in and out of the classroom (Blank & Archbald, 1992). Many honors and/or gifted students can see relationships among seemingly unrelated objects, ideas and facts. Dunn and Stevenson (1997) found that when information was presented in a manner that was consistent with a learning style of a student, that the assimilation and accommodation of material increased in that student and they were more confident in their knowledge base.

The college years are the primary period of transition for young people moving from high school into the professional work force. It is important to understand that as
skills become outdated and new opportunities become available in the future, people will need to find somewhere to go so that they are able to keep abreast of the changes in society. In the past, this place where learning could continue was the college or university as was evidenced by the increasing enrollments in these institutions since World War II. It was at this time that a proliferation of schools, scholarships and grants became available for returning students. It was a time of phenomenal growth, for the community college. There was a large increase in the number of community colleges that were being built. For example, by the Fall of 1970, there were 1,091 community colleges nationwide, this was an increase of 413 community colleges being built in ten years (Witt, et al., 1994). Colleges and universities allow students to keep abreast of this changing economy and society. There was also an increase in funding for students, not only from the G. I. Bill that provided money for education of returning service members, but from Pell grants that made it easier for economically disadvantaged students to obtain a college education (Witt, et al., 1994). Parnell (1990), observed that higher education programs must be more flexible to meet the changing needs of the students while maintaining the ability to move in and out of programs while acquiring knowledge and new skills.

**Elements of Inquiry**

Many instructors who teach separate but similar classes are familiar with the uniqueness of each group of students. Whereas one class may be comfortable covering material rather quickly and completing assignments at regular intervals, another class may become mired in specifics of a particular concept and fall behind the course
syllabus. One reason that this may be occurring could lay in the learning style of a particular class of students. Learning styles can be defined as “... the method one uses to approach a learning task” (Garger and Guild, 1984, p. 11). Some students could be defined as being able to perceive tasks as a whole (field dependent learners), while other students may need to have the tasks broken down into specific parts (field independent learners). The method of perceiving could allow the class to proceed at a faster or slower rate. The idea of a class learning style presents many questions and there are several specific questions that the research will answer:

1. Are there more college students who have a field independent learning style compared with the field dependent learning style?

2. What is the frequency distribution of students who take honors classes and are also field independent based on the results of the Group Embedded Figures Test (GEFT)? This is a test that measures whether one is a field dependent or field independent learner.

3. What is the percentage of students enrolled in non-honors classes who can be labeled field dependent versus field independent?

4. Is learning style associated with gender?

5. What is the frequency distribution of students who take honors classes and are also field independent based on the students race and age?
Significance of the Study

This study attempted to determine whether or not there was a specific learning style of students who took honors classes and succeeded versus those students who took non-honors classes. Success was defined as a passing grade in the class attempted. Research in this area of learning styles has not been previously conducted but could be of great benefit to instructors who teach honors and/or gifted students at the college level.

There are many different approaches that an educator may want to consider in the area of learning styles:

1. An educator may decide to use the learning style as an awareness tool. This would make students aware of the perspectives of other students.

2. An educator may decide to use learning style as a process approach where more options are given to students to complete activities and studies given in the class.

3. The educator may choose to use discovered learning style as a key element in matching the student and instructor to make sure that there is a matching of style in the classroom.

4. An eclectic approach may integrate all the above approaches rolled into one. Being aware of the learning styles an instructor could make sure that different activities and perspectives are given enough different activities that every student is able to successfully complete any and all assignments.
Participation in education as a college student is dependent upon many factors: career advancement, jobs, motivation and interest. It is with this variety of needs that lends to the great diversity on the college campuses today. Most college students are eager to learn the information that is being presented in one class so that they will be capable of moving on toward the next class level and ultimately to graduation (Harrigan, 1998). The results of this study may indicate that there are some activities that should be included in the teaching of honors and/or gifted students so that they are able to reach their goals more efficiently. This study may also indicate some activities that should be removed from gifted/honors programs as being ineffective for the advancement of learning. This study may help set the direction of those activities by providing novel and challenging ideas to the problems posed by students having some type of difficulty learning a concept. Educators should encourage students at all levels of education to be creative in developing and formulating plans and solutions to attack problems in learning.

Understanding how the honors and/or gifted students assimilate and accommodate information will allow instructors of these students to present information in a manner that may increase the critical thinking, creativity and communication skills of the these students. These are skills that ultimately will allow these students to reach not only their academic potential but also the life goals that they have established for themselves. This information should not compromise the academic instruction but may allow for the students’ ultimate enhancement of learning.
Definition and Description of Terms

There are many terms and definitions that refer to learning styles. The terms and
the definitions used in this study are listed below:

1. Learning Style: "...stable and pervasive characteristics of an individual,
expressed through the interaction of one's behavior and personality as one
approaches a learning task" (Garger and Guild, 1984, p. 11).

2. EFT: Embedded Figures Test. This is a test that was an individually
administered to determine whether one had a field dependent or field
independent learning style.

3. GEFT: Group Embedded Figures Test. This test was designed to provide
an adaptation of the EFT that would make it possible to have group
testing. Many of the figures on the GEFT are taken directly from the EFT.
The evidence of validity and reliability make it appear that the GEFT is a
satisfactory substitute for the EFT.

4. Field Dependent Learner: refers to a global way of perceiving information,
prefers collaboration, and is extrinsically motivated. These students also
like direction in activities and prefer to work in small groups. They would
rather plan what they want to say than have to spontaneously expound on
their ideas. For example, these students tend to be socially aware and
conform to the people around them and although they have a difficult time
organizing unstructured information, they tend to be perceptive and
intuitive (Herold, et al., 1974) This term is often abbreviated as FD.
5. Field Independent Learner: refers to the learner being able to experience items as discrete from their background and reflects the ability to perceive items and/or objects with a larger context. These students usually prefer lecture type classes and are comfortable with impromptu questioning of ideas. They prefer to work alone and have less supervision or direction from an instructor. For example, these students are more self-reliant and are extremely task and achievement oriented while they are organizing information to fit their needs (Herold, et al., 1974). This term is often abbreviated as FI.

Limitations

This study may be limited by the following factors:

1. The study was conducted at one campus of Valencia Community College Campus, in Orlando, Florida.

2. The results of the study were dependent upon the self report of data by the students.

3. The study may be limited by changes in administration of the GEFT based on changes in curriculum.
Assumptions

The assumptions for this study included:

1. Field Dependency and Field Independence can be measured accurately by the group administered GEFT.

2. Student self-reporting on whether they are field independent or field dependent was accurate.

3. Student self-reporting on whether they have taken honors classes was truthful.

4. The GEFT was administered in a variety of classes with diverse student populations.

5. Students with a variety of learning styles were enrolled in the classes where the GEFT was administered.
CHAPTER TWO

LITERATURE REVIEW

Some instructors may feel intimidated by students who might have a quick grasp on some of the material that other students struggle to learn. Instead of providing challenging activities for these students who are able to assimilate information quickly, many times the teacher will allow the ‘brighter’ students to assist with the teaching of the ‘slower’ students (Reis, et al., 1998). Some ‘slower’ students may not appreciate being taught by a peer and some ‘brighter’ students may develop boredom and isolation from their peers (Jones & Southern, 1991; Kulik & Kulik, 1984). At any rate, these students are being separated from their peers in the classroom, either intentionally or unintentionally, not only by their peers but by their teachers as well. One national survey, conducted in 1990, found this is the group of students who are not achieving in school at a level equal to their ability (Tomlinson-Keasey, 1990). There is no written agreement as to who can qualify nationwide as a student who meets the criteria of being an honors and/or gifted student. Howard Gardner (1983), has identified seven separate intelligences while J. P. Guilford (1988) identified 180.

The evaluating and labeling of students is not always a preferred method of dealing with differences in ability, but sometimes it is the only way to make a distinction.
There are three characteristics that most researchers tend to agree fit the honors and/or gifted student. The ‘honors’ and/or ‘gifted student’ (IQ greater than 130 on a standardized IQ test) is more frequently aware of the world around him/her and are more curious about the relationships that they see in that world. It is believed that this student thrives on the probability that they will be able to observe what happens in interactions and enjoy the manipulation of materials (Reis et al., 1985). These students also tend to have a high level of creativity and a high level of motivation or task commitment to achieve highly in one area or another (Renzulli & Reis, 1991). Lewis Terman (1959), in an ongoing study that is scheduled to be completed in 2010, found gifted students to be not only larger and stronger than their peers, but also healthier, more emotionally stable, earlier walkers and better adjusted as adults than the general population. Of course, one of the confounding variables to this study, may have been that the students who were recommended by their teachers to participate could have been better adjusted students to begin with and were well liked by their friends and teachers because of their social adjustment. As must be noted here, there is a great diversity among all students, no matter what level of ability they possess, therefore, not every honors and/or gifted student is well adjusted, emotionally stable, highly motivated, and healthier. These positive studies have fostered a false sense of security in that many educators do not feel the need to meet the emotional and social needs of students who are so well adjusted (Gallagher, 1980).

One ability that is integral to being perceived as successful in our culture, is the ability to get along with others (Lovecky, 1986). All students must be able to develop
interpersonal relationships and leadership skills. These skills are necessary for all students because these are the skills that enable one to interact and participate in social activities. The honors and/or gifted student may require guidance that is significantly different from other students to develop these skills. Getting these students involved in their community and exposing them to issues on the campus can make a big difference in the level of involvement and social service (Harrigan, 1998). Without the development of these characteristics and skills, the leadership potential as well as the academic potential of these students may go unrealized. If an honors and/or gifted student is able to develop these interpersonal skills in their interactions with other students and teachers, then this activity may be of great benefit for everyone involved. However, if the honors and/or gifted student is unable to learn this skill during a ‘teaching activity’, this may not provide any benefit to the educational and/or social needs of these special students (Blackburn & Erickson, 1986).

It is also important to note that because these students are assimilating information very quickly, they are often more sensitive to their perceived shortcomings and discrepancies in their knowledge base. This problem may be highlighted when they are trying to direct another student in the acquisition of this skill that they may not be totally comfortable with (Gallagher, 1975). This ‘peer tutoring’ activity may serve only to exacerbate the perceived inadequacies that the student already feels. Many honors and/or gifted students already feel removed from many of the peers as they struggle with the fact that are different from them and this only exaggerates this feeling. In a survey
that was conducted by J. Galbraith (1985), many honors and gifted students felt that being labeled as such was not all positive. They cited complaints such as:

1. No one ever explained to them what being labeled honor and/or gifted was all about. Many of these students felt that it was a “big secret” that was kept from them.

2. Many students complained that everything that was presented in school was too easy.

3. Everyone (parents, teachers and friends) expected them to excel in every activity that was presented.

4. Other students often treated them differently.

5. There were few people that actually understood them and their feelings.

6. Many students felt overwhelmed by all the skills that they possessed and they had a hard time making a decision of what to do in life.

7. World problems often made them feel uncomfortable because they felt helpless about being able to do something about them (Galbraith, 1985).

These were only a few of the more common complaints cited by students in honors and/or gifted programs at all levels of the educational system.

One possible solution to keep the honors student excited in the activity and pursuit of learning would be to place all honors and/or gifted students with the ability to assimilate information quickly in the same classroom (Reis, et al, 1998). This type of tracking would offer more stimulation and may challenge these students to reach their potential both inside and out of the classroom. There
are several issues that should be addressed when considering the educational direction of the honors and/or gifted student. One of those issues is how the student should be grouped and paced, and the other one is what teaching method is most effective?

Controversy can be raised in a room full of educators, in a matter of minutes, and it only takes one word. That one word is ‘tracking’ (Reis et al., 1998). Just the word can raise strong arguments both pro and con. Despite the many studies (Reis et al., 1998; McIntire, 1998; Gallagher, 1995) that have been conducted to determine whether tracking or ability level grouping is beneficial or detrimental to the academic achievement level of students, there is no one consensus. The only consistent finding that the many studies have yielded is the inconsistent results (Reis et al., 1998), in a large measure because of the variability in which the studies have been designed. Correlational studies, by design, are unable to rule out extraneous variables and therefore are unable to validly predict results based on tracked or non-tracked students. Experiments conducted with random class assignments and controlled variables, generally leave out the “gifted” students, or only have such a few students in the study as to be useless in generating useful data (Gallagher, 1995). All of these problems lead to the question of generalization of the results of the studies. Since there is such controversy most policymakers focus on the studies that support their position while ignoring the other studies (Reis et al., 1985).

Because of this need to further examine the surroundings, the honors and/or gifted education environment can be very positive or negative for the honors/gifted student. An environment that is ‘enriched’, that is, made more thought provoking and more
sophisticated may lead to more positive affects. Many students who have a higher than average IQ often have difficulty when interacting with students who have an IQ that is considered to be within the normal range (Blackburn & Erickson, 1986). Many times, this problem arises from the fact that this student is more fascinated and has far more questions on subjects that are being presented than the student in the non-honors class (Blackburn & Erickson, 1986; Lovecky, 1986). It has been observed that the average non-honors student is more likely to be content with learning the information as presented and become "restless" when questions are asked that "certainly won't be on the test." Being placed with other like-minded students then is able to provide the honors and/or gifted student not only with a sense of group membership, but also provides a positive identity message which also allows him/her to be set apart from his/her peers in a positive way (McIntire, 1998).

Frequently the honors and/or ‘gifted’ student is made to feel different by his/her peers because they ask so many questions. The need to develop a positive identity is crucial (Blackburn & Erickson, 1986). It is just as important for the honors and/or gifted student to develop a positive self image as it is for the student in the non-honors classroom. Many times the identification of a gift or talent can lead to an identity confusion or underachievement (McIntire, 1998). However, some students see this higher potential as being more valuable and set up such high expectations that they are never able to reach their goals and either cause problems in the classroom or become “at risk” for dropping out of school (Blackurn & Erickson, 1986; Lovecky, 1986).
Many college and university professors have experimented with many different instructional approaches, such as case studies, cooperative learning activities, independent studies, role playing, and simulations that are goal directed to improving academic attainments (Clay, 1994; Katz & Henry, 1998). When an instructor is attempting curriculum designs for these honors and/or gifted students, they should take into consideration the addition of creative activities as well as activities that will increase their independence in thought. The accumulation of more factual knowledge should not be the sole objective (Woolfolk, 1995).

Honors and/or gifted programs in universities and colleges can also be set up in many different ways to meet the needs of not only the students but the needs of the instructor as well. This is definitely not as easy as it sounds because many different colleges have set up honors programs trying to meet the needs and challenges of this group of students (Harrigan, 1998). Many college instructors and politicians alike question the integrity of the educational product (Bryant, Dec/Jan, 1994-1995). In order to augment learning, certain critical practices are necessary: teachers need to involve students in learning, set high expectations, assess learning and provide feedback. Standards in the classroom must be maintained. “Accreditation criteria stipulate that an educational institution must define its expected education results and describe how the achievement of these results will be ascertained. Specific planning and evaluation processes and criteria are not stipulated. Consequently, there is a smorgasbord of processes, methodologies and criteria available for use.....It is the emphasis on measuring
change in academic achievement that provides the basis for the battle of instructional effectiveness" (Bryant, Dec/Jan, 1994-1995).

How can this instructional effectiveness be incorporated in well established college curriculum with honor and/or gifted students? There are several ideas that have been considered:

1. The instructor has direct control of the class that they are instructing in a discipline orientated approach.

2. Instructors can integrate disciplines so that the student can perceive the connection between several disciplines.

3. Discipline based instruction maintains the tenets of academic freedom since the instructor has control over what will be introduced in the class room (Bryant, Dec/Jan., 1994-1995).

Some honors and/or gifted programs are set up so that instead of receiving a differentiated learning experience to enhance the area of strength, each student receives the same assignments. Although these assignments are the same for each student, the student may have the option of completing that assignment in the way they determine that best meets the criteria for grading. This is the type of instruction that has been determined to best meet the needs of the honor and/or gifted student. Through research it has been found that it is far better for the student when an integrated-thematic curriculum has been designed to meet the individual needs of each honors and/or gifted student, then to just distribute an assignment with no flexibility in the completion (Walker, et al., 1999).
Another method of enhancing an educational experience is by using the magnet school concept. This is another way to address the needs of students with higher than average ability in assimilating new information. A magnet program offers advanced studies to selected students (Blank & Archbald, 1992). The student who is accepted into a magnet program has been tested and interviewed in hopes of enrolling only the most academically appropriate and motivated students into this limited access program. These magnet schools offer programs that attract students with common educational interests but diverse backgrounds and abilities who are all interested in learning a specialized curriculum. By grouping students with similar interests together, it allows the common characteristics that gifted students generally share to be nurtured in a way that is positive for the development of the student. This will allow students with high academic ability levels to have their needs met in the academic arena while also providing a safe environment to enhance their social skills with like-minded students as well. It is more comfortable to interact with someone who has similar interests and talents then it is with someone who has no similar interests or abilities. In fact, Schroer and Dorn (1986), emphasized the importance of bringing honors and/or gifted students together in groups to discuss concerns and share ideas with other like-minded students. Many honors and/or gifted students need to have a large number of friends, each of whom can meet a need or reflect some aspect of personal self (Lovecky, 1986, p.574).

Another factor that must be considered when the subject of honors and/or gifted education is discussed, is that an instructor is dealing with students who may already have a grasp on material that is academically appropriate. This means that the student
may be ready to look at information that generally would be considered to be "beyond the reach." But is it really beyond? Just because the educational sophistication of the student may not be 'average' for entry into that curriculum, doesn't mean that the student won't be able to grasp the information. The real key to this issue is a clear assessment of abilities and status in the curriculum sequence (Feldhusen, J. F. et al, 1996). When there are many students who vary markedly from the norm, it may be a tremendous burden on the instructor to try and meet every educational need of every student in the classroom. If these students are grouped appropriately, one student may be able to provide the intellectual stimulation that another student needs in order to advance in a different direction or change their point of view.

Some educators have found that every student is different and has a variety of needs. Many educators also realize that these diverse needs may not be met in a single classroom experience (Reis, et al., 1998). Reis, et al. (1998), favors what is termed differentiated curriculum and instruction. This allows the educators to view students as individuals with their skills, interests, styles and talents (p. 2). According to Reis, this allows educators to do something termed 'curriculum compacting,' that is "glossing" over the curriculum that is understood and replacing it with more challenging material, often based on students' interests. Of course, there are a variety of other options to increase the retention and learning of all students and educators alike. Many educators willingly accept that fact that all students are individuals with unique gifts and styles of learning, and that the task of meeting the needs of the honors and/or gifted student in the classroom environment will be a large undertaking. Many instructors who teach honor
and/or gifted students must build learning activities into their own professional life so that they have these experiences to share with the students they are instructing (Stallworth, 1998). This is conducive to modeling good teaching and learning behavior and presents more opportunities for the instructor to interact on a contemporary basis with the students in the classroom.

Just because students have been placed in an honors and/or gifted classroom does not automatically mean that those students will be able to successfully complete the course because they are intelligent (Randall & Copeland, Fall-Winter, 1986-1987). It is very interesting for advisors, counselors and instructors at all levels of education to peruse a student's schedule and grades. Many times, after looking at a schedule and the ensuing grades, there are many more questions than answers. Why did this student fail this easy class while successfully completing a higher-level content area class? What is it about that class that he/she performed so much better or worse than normal? Another puzzle for an instructor is to have a student come to them and say things such as, “I don’t understand why I am not doing well in this class! This is the only class that is causing me problems!” Comments such as these have spurred many instructors to question his/her teaching methodologies and try to research this diverse topic. Since this has been a chronic complaint from many different instructors for many years, there have been many hypotheses suggested for solving this persistent dilemma. These hypotheses deal with the fact that many times a student may do well in a class, not because of their intellectual ability, but because the learning style of the student and the teaching style of the instructor make learning, for that student, in that class, a successful combination (Witkin,
The concept of learning styles and the relationship in academic processing has led many people to postulate some very interesting ideas. Some of these ideas include the possibility that the way new material is presented is overall uninteresting to many students because of their learning style (Witkin, et al., 1977). With the great differences in learning styles that exist in a normal classroom environment, this scenario may present realistic complications for all students (Hagy, 1996). Another interesting idea is the supposition that when course is designed and presented in a learning style related to the way a student learns that the achievement of the student increases significantly (Dunn & Stevenson, 1997). Pintrich and Johnson (1990) suggest that it may be difficult for the student to change his/her learning style but may be able to employ learning strategies to help in the understanding, integration and retention of new information (Cross & Steadman, 1996).

The idea of people differences has been around for many years. Neo-Freudian psychoanalyst Carl Jung (1875 - 1961) divided people into personality types using the term introversion and extraversion as early as 1921 (Kassin, 1995, p. 652). Psychologist Gordon Allport (1897 - 1967) referred to personality as being a consistent pattern of behaviors for each person. He came up with a list of 4,500 words that could be used to describe people and grouped these words into 200 clusters of related traits that he felt were the building blocks of personality types (Kassin 1995, p. 587). Raymond Cattell took these 200 clusters and broke them down into 16 factors or source traits. Cattell felt these source traits described people and their style more concisely than the 200 clusters (Kassin 1995, p. 589). Each of these theories resulted in further delineation’s of what
these traits meant to the individuals in their dealings with life. How each person responds to the stimuli in his/her own environment is based on the unique perceptions of that particular person.

There are several individuals who have been involved with the issues revolving around the attempt of classifying and categorizing the learning styles of students (Dunn & Stevenson, 1997; Dunn & Dunn, 1993; Grasha, 1983; Hagy, 1996; Hawkins, 1998; Kiewra and Frank, 1988; Macneil, 1980; Skipper, 1990; Sternberg, 1993; Witkin, 1976). The general consensus is that if students understand their particular learning style(s) and they are aware of their strengths and weaknesses, then they should be able to maximize their learning in a classroom environment if they want.

Many different ideas have led to a variety of tests that have been developed to assist students in understanding their particular learning or cognitive styles (Lawrence, 1993). However, many students are not exposed to these tests until they reach college and are taking classes in psychology or a study skills class or perhaps an adjustment class. This means that many students may have been needlessly floundering in their classes all through school simply because they were unaware of their particular learning styles. A student exposed to the idea of learning style may have a definite advantage over his/her peers if the student were able to utilize this knowledge for the benefit in studying (Kroeger & Thuesen, 1988). Testing students early in their school careers so that they would become aware of their particular learning styles could enable them to become better students. It may also encourage them to explore other options of learning new material (Myers & Myers, 1980). However, testing these students without giving
them any feedback is totally useless to the student. A very capable student may feel like a
total failure when he/she feels that they are incapable of excelling in a certain class based
on previous classroom experiences. These students need to realize that classroom
activities are not always based on the best interest of individual students, but are, out of
necessity, directed toward the masses. Many highly intelligent students fail classes in
college because they are unable to grasp the information being presented in the
classroom. These students may never learned how to study because everything has
always come so easily to them, and they are unaware that they do not know how to study
until they flunk that first test or class.

Because of the interest expressed by educators in this area, researchers are also
developing more tools that describe learning styles (Myers & Myers, 1980; Kolb, 1976;
Kroeger & Theuesen, 1988; Lawrence, 1993; Witkin, et al., 1971; Renzulli & Smith,
1978). As higher education becomes more accessible to all students, educators are aware
of the continuing discrepancies that they witness in the classroom on an everyday basis.
Most educators want to do everything possible to assist in the teaching and, hopefully, the
education of their students.

When researchers became interested in this area, it was thought that the answer
might lie in personality types (Myers & Myers, 1980; Lawrence, 1993; Grasha, 1983).
As a result of this interest, many books were published on personality types. An early
example of this attempt was People Types and Tiger Stripes (1993) by Gordon Lawrence
and Type Talk (1989) by Otto Kroeger and Janet Thuesen. These are just two books that
have concentrated on this now popular educational topic. These publications led to the
attempt to correlate personality types with learning styles. The Myers-Briggs Type Indicator is one of the most well known of the personality types test. An experiment conducted with this test found that students who tested as being N's (intuitives) on the Myers-Briggs were found to prefer classes where theory, speculation and interpretation was valued while those students that tested as being S's (sensing) tended to thrive in classes where practicality and facts prevailed (Hawkins, Winter 97/98, p. 2). Essentially, what these and many other authors have done is taken a paper and pencil personality assessment and attempted to predict the cognitive or learning style based on the personality characteristics of the student. In fact, the terms cognitive style and learning style come from the both the cognitive information processing theory and personality theory, as well as from research on aptitude-treatment interaction (Kassin, 1995, p.590). Keefe (1982) has stated that core personality structures are manifested in various levels and domains of psychological functioning: intellectual, affective, motivational, and cognitive style. Most personality assessments do not show rigid obedience to certain ideals but instead indicate preferences of the individual in dealing with their environment. Learning style is an individual’s method of dealing with information by taking it in and processing it. Since every individual is unique in the perception they have of their environment, it would make sense that individuals have preferred ways of processing and organizing information and for responding to environmental stimuli (Shuell, 1981, p.46). Shuell describes this way of processing as having to deal with response time. Although two individuals may have an equal knowledge base, one student will respond more rapidly while the other student may be more reflective in their response.
Many educators would agree that because of many variables, most classes are taught so that the majority of students succeed (Kiewra & Frank, 1988). Large class sizes often makes individualizing curriculum an almost impossible task. If an educator understood that the class they were preparing to instruct consisted of all honors and/or gifted students, they would be able to prepare different types of information for the class than if the class was considerably more diverse.

But what purpose does knowing the learning styles of students serve? Should educators test everyone and check to see what their learning style is? Does learning style change with age? If a student is matched by his/her learning style to a teacher with the same style, will the student learn better or more? Can a person make a conscious decision to change his/her learning style and then do it? Can a student learn from a teacher who does not teach in the same style in which the student learns? Is learning style associated with gender or does gender even make a difference?

These are only a few of the many questions that are being asked by educators concerning learning style. "In North America, work in the area of learning styles has been more theoretical in nature and researchers have generally approached the topic from the perspective of cognitive and psychomotor psychology" (Hendricson, Berlocher, & Herbert, 1987, p. 175). This statement indicates that there are different researchers in different countries, working on the various aspects and meanings of learning styles. As of yet, there is no final or conclusive evidence of validity to support or reject any of the evidence obtained thus far (Hendricson, Berlocher, & Herbert, 1987).
As for the educator, information about learning styles may allow for one to be more sensitive to the uniqueness of each and every student in the classroom. Likewise, information about one's own teaching style may make it simpler to help students learn. The origin of one’s learning style is unknown, but it is theorized that from early life, people tend to adopt habitual ways of dealing with their environment. These habitual ways of dealing with the environment, become spontaneous and eventually become one’s learning style (Witkin, et al., 1977).

Although it may be beneficial to teach students in a style that is consistent with their learning styles, educators must also scrutinize the possibility that learning in a style that is foreign to a student may eventually benefit a student. This would be because he/she is being forced to learn new interpersonal and intrapersonal skills that may be of greater benefit in the "real" world down the road. This growth in skill development may help the student accommodate to the diversity of environment that will be necessary to succeed in their chosen occupation and their social life (Witkin, et al., 1977).

What precisely is a learning style? Some educators may define learning styles differently than other educators. There needs to be a universal understanding of what precisely is being measured. As mentioned earlier, some researchers have attempted to correlate personality types with learning styles and or cognitive styles (Myers & Briggs, 1980). For the purposes of this research, the definition of what a learning style is has been adapted from several different sources and includes the idea of a “....stable and pervasive characteristics of an individual, expressed through the interaction of one's behavior and personality as one approaches a learning task” (Garger and Guild, 1984, p.
11). These sources include David Kolb who drew upon the works of Dewey (1938), who felt that experience was an important part of learning; Lewin (1951), who stressed the importance of active learners and Piaget (1952), like Lewin, who felt that learning was a product of environmental factors and interactions. Dunn and Dunn (1993) describe learning style in terms of each person’s ability to master new and difficult knowledge. Learning style is a complex set of interactions which allows one to view the whole as being greater than the parts. There may be some emerging evidence on brain research that may give one reason to believe that genetics may be one component part of learning style (Deary, 1999). Therefore, learning style may be representative of both inherited and environmental influences.

Learning also can be defined as two separate processes: 1) the perception of how we take in our reality and 2) how we internalize or use these new ideas. Learning itself is a relatively permanent change in behavior, brought about by practice or experience (Davis & Palladino, 1997, pg 111). These definitions describe learning but what is a learning or cognitive style? For learning to take place, students must be able to perceive their environment and react to it on a consistent basis.

It is theorized that another way that perceptual – cognitive styles could be defined is through the supposition that a student is either more responsive or less responsive to the amount of stimuli that is presented. Some students are unable to focus on the specifics of a subject while other students are unable to focus on the generalities of that same subject (Herold, P. L., 1974). Herman Witkin, in the early 1940’s, became intrigued by the observation that some airline pilots would fly into a bank of clouds right side up
and fly out of that same bank of clouds, upside down, without realizing that they had changed position (Woolfolk, 1995, p. 127). His interest led to a great deal of research on how people separates one factor from the total visual field. This research led to idea of field independent and field dependent cognitive styles or activities (Witkin, et al., 1977). These terms were defined in chapter one. Field dependent learners are those who refer to a global way of perceiving information, prefer collaboration, and are extrinsically motivated. They have difficulty focusing on one aspect of the situation, picking out details, and analyzing a pattern into different parts. They enjoy social situations and tend to have a good memory for social information. Field independent learners refer to those who are able to experience items as discrete from their background and reflect the ability to perceive items and/or objects within a larger context. These individuals are not as cognizant of social situations and tend to prefer endeavors where sociability factors do not play a dominant role.

The research conducted on learning style thus far has centered on the difference between field dependent and field independent learning. The difference between these two styles of learning can be defined as:

“The person who, in the laboratory, is strongly influenced by the surrounding visual framework in his perception of an item within it is also likely, in social situations, to use the prevailing social frame of reference to define his attitudes, his beliefs, his feelings, and even his self-view from moment to moment. Thus, if you substitute for the wooden frame, a social frame of reference,
and for the rod, an attribute of the self, such as an attitude or sentiment, there is indeed continuity in that a person is likely to do in both the laboratory perceptual situations and social situation” (Witkin 1976, p.43).

Learning styles appear to be relatively stable over a period of time. Witkin (1976), believed that by puberty learning style was in place and unless one made a deliberate effort to change, it would remain relatively constant. Learning or cognitive style appears as a preference for a particular learning environment. The style focuses on a process rather than on the content of the information. Learning styles are different for each person and emphasize individual differences in perceiving, thinking, solving, and learning information about the environment. Learning styles are also neutral in value (Witkin, et al., 1977). There is not one learning style that is adequate in every situation. Some concepts would be better dealt with using a field dependent style where one could deal with the entire situation at once in a deliberate, passive and somewhat rigid approach. Other concepts would be better dealt with using a field independent style. This style is where one would deal with the items independent of each other in an active processing manner. This would allow the student to restructure the concept, if necessary.

According to Arthur Combs (1976), figure and ground are not always represented by physical stimuli alone. The figure is something that is experienced as discrete from the background while the ground entails the observation of the total field instead of discrete items within the field. Previous learning or experiences may also influence perceiving that there is a difference between what is figure and what is ground in a problem.
Defining field independent and field dependent learning does more than just describe our ability to discretely or globally perceive stimuli. It can also describe how information is being processed within our brain. One thing that must be recognized is that no one is completely field dependent or field independent - these characteristics always run along a continuum (Herold, 1974, Witkin, et al., 1977). However, one question that does arise is what makes a person field dependent or field independent?

Research that has been conducted has revealed, through the interpretation of the researchers, that there appears to be many factors that can influence whether one is a field dependent or field independent learner. Claxon (1987, p. 9), believed that socialization and child rearing practices could affect the type of learner a child would be later in life. Field independent learners appeared to be encouraged at an early age to be autonomous while field dependent children are encouraged to be submissive to authority figures and peer groups. Some of the children who later become field-dependent were also encouraged to refer to others as they spoke while field independent children were encouraged to use many more personal pronouns (Witkin 1976). Dunn & Griggs (1995), found that learning styles could change over the years but Witkin, et al. (1976), found that most students remained relatively stable over the years. According to another researcher, Price (1980), learning styles may vary with age. Other researchers have found differences based in achievement level and culture and the learning style (Dunn & Griggs, 1995; Dunn, Griggs, Olson, Gorman, Beasley, 1995). These are only a few of the correlated variables that have been discovered by educators. However, there have been no replicated experiments that will substantiate these findings.
Some researchers have hypothesized that field independent students choose subject areas that allow them to work alone or with one or two other individuals because of the need to be autonomous. Some examples of careers that would encourage field independent type tasks would be areas such as engineering, science, mathematics, experimental psychology and architecture. Likewise, students who would be classified as field-dependent students would choose subject areas that would be more interpersonal in nature. In fact, in a study done by Witkin, et al. (1977), it was found that the field dependent student was more likely to stand closer to other people in a group when presenting a brief presentation on a topic assigned to them. The subject areas chosen by the field dependent students included disciplines like humanities, counseling, elementary school teaching, nursing and the social sciences (Witkin 1976; Witkin, Moore, Goodenough & Cox, 1977). Complementing these findings were the studies of persons already engaged in the disciplines as listed. It was found by several researchers that the field independent learners were successful in occupations such as Air Force captains, mathematics-science teachers, engineers and architects, and individuals who were field dependent were successful in occupations such as social studies teachers, social workers and writers (Witkin, et al., 1977, p. 43).

Witkin (1976) has proposed that there is also a gender gap based on some early research that he conducted. According to his research, more women than men have been found to be field dependent. Many women tend to find employment in careers that tend to have a great deal of interaction with others. Women who tend to choose careers in
field independent areas also are disposed to score high on scales that measure masculinity/femininity in other paper and pencil personality assessments (Witkin 1976).

With the results of this early research, there is another area in question that is generating a lot of interest in the field of education. This question deals directly with the outcome of teaching a student in a way that matches their field-independence or field-dependent style. Would this student have better retention abilities and thus learning be improved, or would there be little difference? For example, an instructor who has a field dependent teaching style would emphasize global aspects of the information, model desired behaviors, gives guidance to students and encourages cooperation between students. The instructor who teaches in a field independent style would encourage independent student achievement, encourage competition between students, focus on the details of the problem and emphasizes discovery learning so that the student will be able to construct their own rules and generalizations for problem solving. Should a teacher shift from instructional style based on cognitive learning style factors or not? Research done in this area has been contradictory thus far. Some of the studies have indicated that matching instructional method with cognitive style did not lead to improved learning (Abraham 1985). However, there are other studies that have indicated that some students learn better on matched cognitive and teaching styles (Abraham, 1985, p. 699). Some instructors willingly and with ease adapted their presentation style to their students learning style (Witkin, 1977, p, 32). It is plausible then to believe that with appropriate training methods, that teaching approaches may be easily modified. The only inescapable
conclusion that this research did provide, was that matching or mismatching students and instructors can take place on several different levels:

1. students and teachers of the same learning style (Witkin 1976);
2. instructional method and students' learning style (Abraham 1985; Macneil 1980); and
3. matching student style with the amount of structure provided by the teacher.

It may be too much to expect any instructor, especially one with several students to provide individual instruction to every student in his or her own learning style. DiStefano (1970) found that in the classroom situation, teachers and students who were matched in learning style viewed each other more positively than students and teachers who were not matched in their learning style.

There are many ways to provide options for students in the classroom that will allow them to learn in their preferred styles of instruction at least part of the time. Because of the unfamiliarity of learning style assessments, many students may not have the information they need to determine what learning style will best accommodate their own needs (Witkin, 1976). Just because the honors and/or gifted student may have a preference for one learning style over another, and they are able to use that preference in the classroom, will not automatically guarantee success in all disciplines all of the time.

There are many honors and/or gifted students who will put forth the minimum amount of effort they can in order to get the grade desired. These students have never had to study and as a consequence, do not understand the technique of how to study
Many honors and/or gifted students have always been comfortable in the academic environment because learning has always come easily to them. Even though he/she may achieve only mediocre success, he/she is willing to continue with the study repertoire that is comfortable over what may be perceived as time consuming and more difficult. Learning is not always an easy endeavor. As these students succeed and move upward toward the resolution of their academic career, they may benefit from the development of new and maybe even better ways of learning. These new ways of learning and understanding may be gleaned from an educator who is willing to try novel ways of instructing students in order for them to gain as much knowledge as possible.

Summary

Snider (1990) concluded that “People are different, and it is good practice to recognize and accommodate individual differences. It is also good practice to present information in a variety of ways through more than one modality.” The brain is being studied and analyzed on a daily basis. The more researchers find out about the brain, the more amazing the brain truly becomes.

Honors and/or gifted students amaze many researchers. How thinking and learning occur in these individuals is an area of great puzzlement. It is understood that the honors and/or gifted student may need a different type of guidance than the average student to meet the potential that they have. In reality, researchers know very little about the honors and/gifted student because there is so little research conducted with them.
specifically. When these students have been included in research projects, there are so few of these students that generalizations are hard to make. What is just as puzzling though, is how can the top potential of development be reached? Researchers are always looking for this answer although there is no general consensus as to how the honors and/or gifted student should be identified or taught.

Several ideas have been advanced that have been considered effective teaching techniques of the honors and/or gifted student. These ideas include tracking these students into similar classes, magnet programs and special education programs that are developed just for the honors and/or gifted student. In situations such as these, the honors and/or gifted student is able to grow not just academically but socially. This is important for all students because it is a critical component of what is thought of as success in our society.

An area that should be explored in the honors and/or gifted realm is the area associated with learning style. There are several different tests to determine learning styles, however, one test the Group Embedded Figures Test (GEFT) looks at learning style on the basis of being either a field dependent or field independent event. The difference in perception is explained by looking at how the student perceives the situation being presented. The field dependent student is one who observes a situation in a global way while the field independent person observes the situation in parts apart from the whole. Learning style can be defined as the way an individual takes in information and processes it so that it can be absorbed or learned.
There are many unknowns about learning styles. Can a student learn better if taught in a style consistent with his/her learning style? Does a learning style change with age or must one make a considered effort to change? For a student to learn, attention must be given to the stimulus that is supposed to produce the learning. Researchers have found that learning style affects not only how much the student is paying attention but to what the student is paying attention. Many honors and/or gifted students have no idea how to study because they have never had to know. If consideration to learning style could be given, would these students excel even more than they are presently?

Most of the literature presents more questions than answers. Perhaps this research will provide some answers to the questions regarding learning style.
CHAPTER THREE

METHODOLOGY

Introduction

Changes in curriculum presentation can affect more than what is being taught in the classroom. These changes can affect how the students feel about an entire discipline and may influence their future professional careers. This research study to determine if there is indeed a difference in the learning styles of honors versus non-honors students may lead to more diverse methods of presenting information to this group of students. The researcher hypothesized that there is indeed a difference in learning style between the honors and/or gifted student as compared to the non-honors student. This researcher did not expect to find that all honors and/or gifted students possess the same learning style. Likewise, this researcher did not indicate that all non-honors student will have a single learning or cognitive style. If the hypothesis is correct, the researcher anticipated finding a significant number of honors and/or gifted students who had like learning styles and a significant number of non-honors students who also had like learning styles. If the hypothesis is correct, then an educator could offer more alternatives to complete assignments that may increase the broad knowledge base of that student. Knowledge of a student’s learning style can provide insight as to which teaching strategies and what type
of environment is more likely to produce the most desirable results concerning retention of the student and material learned (Witkin, et al., 1977).

Assessment of Learning Style

Colleges must focus on the adult and the needs of the adult learner. It was found in 1998 that sixty-five percent of the students who graduated from high school also completed some college and thirty-two percent of those students completed four years of college (government publication, 2000). The U.S. Census Bureau reported (1980), that one in three adult students were over the age of twenty-five (Kelly, 1986, p. 5). This data indicates that the adult student population is increasing and will continue to grow as people live longer and continue to work (Parnell, 1990). The U. S. Census Bureau does not break down the information as to what percent of the students qualify as an honors and/or gifted student.

The Office of Institutional Research at Valencia Community College published the findings of Student Characteristics for the 2000/2001 academic year Session I. This report was published on December 15, 2000 (Valencia Community College, December, 2000). It indicated that the number of the First Time In College (FTIC) enrollment was 3,918 students for all of the campuses at Valencia Community College. Of these students, only four hundred and fifty (450) qualified to participate in the honors program at the Valencia Community College. If the statistics remain stable, only 69% of these students, or approximately three hundred and eleven students (311) will graduate from the honors program in the 2001/2002 school year. The rest of the honors students will
withdraw from the college and/or the honors program or delay their education due to a variety of reasons. For Valencia in general, there were 3,363 students who graduated in 1999/2000 academic year, 73% of them received an Associate in Arts degree and 15% of them received an Associate in Science degree. The rest of the graduates received either a technical certificate (8%) or a vocational certificate (4%). The honors and/or gifted students were grouped in these different percentages. There has to be some way to increase the graduation rate of the honors and/or gifted student. Perhaps they have more diverse needs that require novel solutions in order for them to graduate with the degree of their choice so that they are able to pursue the career they desire.

As many college instructors have discovered, the adult college student is ready to learn (Parnell, 1990). This is substantiated by the fact that 17% of the students enrolled at Valencia for the 2000/2001 Session I classes, indicated they were enrolling for “Job Improvement” (Institutional Report, 2000). Most adult learners have found that learning is best coordinated with relevance to real life situations so that they can see how the information is useful (Knowles, 1984). With these ideas and suppositions in mind, how can learning style be assessed?

There are over thirty tests and inventories designed to measure learning style. Some of these tests, such as the Barsch Learning Style Preference Form try to assess the difference between being auditory, visual and tactual learners. The Learning Style Inventory (Renzulli and Smith, 1998) and the Learning Style Profile (Dunn, Dunn, and Price, 1984) also attempt to designate preferred learning styles. These tests do not attempt
to measure the difference between field dependent or field independent learning style. For that reason, the Group Embedded Figures Test was chosen for this study.

The Group Embedded Figures Test (GEFT) was designed to be a group administration of the Embedded Figures Test (EFT). The GEFT (Appendix A) is modeled as closely as possible with the EFT with respect to format and presentation. It contains eighteen complex figures, seventeen of which were taken from the EFT. Since the GEFT is intended as a group form of the EFT, the only way to assess its validity is against the "parent" form of the EFT. According to gathered data, the reliability coefficient for the GEFT and the EFT is reasonably high at -.82 for males and -.63 for females (Witkin, Oltman, Raskin & Karp, 1971). The correlation between the GEFT and EFT should be negative because the tests are scored in reverse fashion (Witkin, et al., 1971). This is important information when looking at the validity and reliability of the GEFT in comparison with the EFT.

Several researchers have used the GEFT as a measure of field-independent and field-dependent learning styles. Urwiler (April, 1997), utilized this assessment tool in determining which interface metaphors worked the best on the learnability of computer systems. Shih (March, 1999) utilized the GEFT for his explanation of learning styles of his students and the students achievement in WEB – based courses. It was discovered that students did equally well on WEB based courses regardless of their learning styles. McLeod, Carpenter, McCormack and Skvarcius (1978) utilized the GEFT to look at the differences in learning style and the level of mathematics learning in numeration systems.
The GEFT has been utilized in many different educational settings where a large number of students were to be evaluated for their preferred learning style of either field dependence or field independence. Because learning styles may affect the success of learning in different situations, educators should be aware and sensitive to these differences and use this knowledge to help their students to succeed in all of their classes.

Researchers have found that when a student succeeds, the self esteem of that student increases (Margerison, 1996). This success in the classroom generally gives the student a sense of success outside of the classroom as well and thus increases the self esteem and confidence of that student (Gurney, 1988).

**Subjects**

This study involved 337 students at Valencia Community College – East Campus. There were thirteen surveys that were returned incomplete and therefore the data was not used in this research. There were 85 males and 239 females who were administered the test and filled out the information sheet (Appendix B) correctly and whose data was used to complete the analysis. There were many classes at Valencia Community College that utilize the GEFT as a regular part of the curriculum to permit students to understand their learning styles better. Several faculty, during the Spring Semester of the 2000-2001 academic year, in different disciplines, agreed to have their students answer a survey that ascertained the scores received on the GEFT, their sex and whether or not they had enrolled in honors classes. The classes that agreed to participate included preparatory classes, student success classes, beginning education classes, mathematics classes, speech
classes, general psychology classes, abnormal psychology classes, computer classes and science classes. Since this was considered to be a normal activity in the classes that were enlisted to participate, the administration of the GEFT should not have caused any undue strain for the instructor as far as trying to work an extra activity into the curriculum. The administration of this test did not change the course design for the students or change the course designs in any way. The instructors also utilized this activity as one that would offer students insights into their study habits. Many of these instructors had a set plan as to when this particular assessment was administered during the semester. This researcher handed out the survey for the students to fill out after the administration of the GEFT at whatever time of the semester the GEFT test was given in the class.

Data Analysis

There were 309 pieces of data that were usable. The data was transcribed and summarized by the researcher based on the results of the self-reports completed, and returned by the students. There were 13 unusable data sheets that were discarded. There were either incompletely filled out or more than one mark per questions was completed.

Descriptive and correlational analyses were utilized to address the research questions. It was believed that a $\chi^2$ goodness of fit analysis would reveal important data. The Chi Square Test is an inferential statistic used to determine if significance exists between expected and obtained results (Wiseman, 1999, p 540). The null hypothesis was that there was no association between honors and/or gifted students and field
independency. The alternative hypothesis was that there was an association between being field independent and being an honors and/or gifted student.
CHAPTER FOUR

RESULTS

Introduction

The purpose of this study was to examine whether or not there was an ascertainable difference in the learning styles of honors versus non-honors students as assessed by the Group Embedded Figures Test (GEFT). Other variables observed in the data collection included gender, race, age, whether the student was part time or full time status and the degree that was being sought. Five research questions were formulated to provide focus for the study. The data was collected from student surveys after the GEFT had been given in the classroom and explanations for the results had been given. Students were also given the opportunity to ask questions about learning style preferences and the meaning that the preference may have for them individually.

The results of the statistical analysis of the data gathered in this study are presented in this chapter. The surveys were given to students enrolled in Student Success classes, mathematics class, speech class, general psychology classes, abnormal psychology classes, developmental psychology classes, political science classes, education classes, speech class, computer science classes, honors classes and science classes on the East Campus of Valencia Community College in Orlando, Florida. Two methods of statistical analysis were used in the tabulation of the results. Tabulation
methods included the use of the Texas Instruments TI-82 graphing calculator™, summary statistics performed by the institutional research department of the community college, and hand tabulation by the researcher. Using narratives, tabular and graphical presentations, the following research questions were answered:

1. Are there more college students who have a field independent learning style compared with the field dependent learning style?

2. What is the frequency distribution of students who take honors classes and are also field independent based on the results of the Group Embedded Figures Test (GEFT) test? This is a test that measures whether one is a field dependent or field independent learner.

3. What is the percentage of students enrolled in non-honors classes who can be labeled field dependent versus field independent?

4. Is learning style associated with gender?

5. What is the frequency distribution of students who take honors classes and are also field independent based on the results of the GEFT test?

Also presented is the data that correlates learning style with age, race, whether the student was a full time or part time college student, and the degree that was desired by the student, either an Associates in Arts degree or an Associates in Science degree. Most of the students who were desiring the Associate in Arts degree were planning on continuing their education at a four-year institution after leaving Valencia Community College. Many of the students who were obtaining the Associate in Science degree were planning on entering the workforce upon completion of their degree.
Percentages of Preferred Field Dependent vs. Field Independent Style

A review of percentages revealed that of the 324 students surveyed, 139 or 43% of them were classified as field dependent while 185 or 57% of the students were classified as field independent according to the GEFT.

Figure 1: Field Independent vs. Field Dependent

Percentages of Honors and Non-Honors Status and Preferred Learning Style

Breaking down these results according to field independent and field dependent learning styles and honors student status reveal that of the field dependent students, 35% of the students classified themselves as being honors students while 65% of them classified themselves as being non-honors students.
The data regarding field independent students revealed some slightly different numbers. The surveys completed by the field independent students revealed that 40% of them were honors students and 60% of them were non-honors students.

Is it possible that gender plays a role in determining whether one has a preference for field dependent or field independent learning styles? Another review of the data from
the surveys revealed that in field independent learners, 27% of them were males while 73% of them were females. Of the field dependent learners, 25% of them were males while 75% of them were females.

Another category that was examined was whether or not ethnic group would lead one to be more field independent or field dependent. The survey form broke down ethnic groups into four categories: Black, Caucasian, Hispanic, and Other. Figure 5 shows the breakdown of the ethnic groups and the percentages in each category for field independent learning style preferences.
Figure 5 shows the breakdown of the ethnic groups and the percentages in each category for field dependent learning style preferences. There was not much difference in the percentages for both categories of learning style preferences.
Figure 6: Field Dependent Learning Style and Ethnic Groups

Viewing this information in a Table format, may make the information easier to compare. Table 1 is provided for ease of comparison of preferred learning style and ethnic groups.

Table 1: Percentages of Preferred Learning Styles and Ethnic Groups

<table>
<thead>
<tr>
<th></th>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>140 / 76%</td>
<td>108 / 78%</td>
<td>248 / 76%</td>
</tr>
<tr>
<td>Black</td>
<td>14 / 7%</td>
<td>9 / 6%</td>
<td>23 / 7%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>20 / 11%</td>
<td>16 / 12%</td>
<td>36 / 11%</td>
</tr>
<tr>
<td>Other</td>
<td>11 / 6%</td>
<td>6 / 4%</td>
<td>17 / 5%</td>
</tr>
<tr>
<td>Total</td>
<td>185 / 57%</td>
<td>139 / 43%</td>
<td>324 / 100%</td>
</tr>
</tbody>
</table>
As can be readily seen from Table 1, Caucasians made up the largest percentage of students who were surveyed making up 76% of the total population. The next largest group was the Hispanic population, they made up 11% of those surveyed, the Black population made up 7% of the population and Other made up just 5% of the population. Most of the population groups were evenly split between preferring field independent and field dependent learning styles.

Age could also be a factor in learning style preference. Ages were broken down on the survey to 16 to 22; 23 to 28; 29 and over. In the 16 to 22 age range, 56% of the students reported preferring field independent learning styles, in the 23 to 28 age group, 66% of the students reported preferring field independent learning styles, and in the age 29 and over age group with 46% preferred field independent styles. Figure 7 shows these percentages.

Figure 7: Age Group and Field Independent Preference
In the 16–22 year old age group 44% reported preferring field dependent learning styles; in the 23 to 28 age group, 34% reported preferring field dependent learning styles; and in the 29 and over age group, 54% preferred field dependent learning styles. These percentages are shown in Figure 8.

![Figure 8: Age Group and Field Dependent Preference](image)

This information may be easier to compare and view if presented in a table format. Table 2 is provided for this ease in comparison of age groups and learning style preferences. There were considerably more students in the age range 16–22 than in any
other age range. There were not enough students in the 36 and over age range to analyze the data separately so it was included in the 29 and over age range.

Table 2: Age Group and Learning Style Preferences

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>16–22 Year Old</td>
<td>141 / 56%</td>
<td>109 / 44%</td>
<td>250 / 77%</td>
</tr>
<tr>
<td>23–28 Year Old</td>
<td>33 / 66%</td>
<td>17 / 34%</td>
<td>50 / 15%</td>
</tr>
<tr>
<td>29 And Over Year</td>
<td>11 / 46%</td>
<td>13 / 54%</td>
<td>24 / 7%</td>
</tr>
<tr>
<td>Total</td>
<td>185 / 57%</td>
<td>139 / 43%</td>
<td>324 / 100%</td>
</tr>
</tbody>
</table>

Students seeking Associate in Arts degrees may have had a difference in preference in learning style versus those students who were seeking Associate in Science degrees. There was a category on the survey form that requested this information so it would be easy to look at this information also. The data revealed that a full 84% of the students answering the surveys were seeking an Associate in Arts degree while only 16% were seeking an Associate in Science degree. Of the students seeking an Associate in Arts degree (A.A.), 57% of the students classified themselves as field independent. Figure 9 demonstrates this fact.
Figure 9: Desired Degree And Preference For Field Independent Learning Style

A total of 43% of the students classified themselves as field dependent. Of this percentage, 85% were desiring Associate in Arts degree while 15% were desiring an Associate in Science degree. Figure 10 demonstrates the fact of the preference for field dependent learning style and desire degree.

Figure 10: Desired Degree And Preference For Field Dependent Learning Style
More students seeking an Associate in Science degree (A.S.) classified themselves as field independent than field dependent – 59% versus 41%. Figure 11 is a representation of this.

Figure 11: More Students Seeking AS Degree Classify Themselves As Preferring Field Independent

Table 3 is presented for ease in comparing the percentages of learning style preference and desired degree sought.

Table 3: Degree Sought and Preference For Field Independent or Field Dependent Learning Style

<table>
<thead>
<tr>
<th></th>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate in Arts</td>
<td>155 / 57%</td>
<td>118 / 43%</td>
<td>273 / 84%</td>
</tr>
<tr>
<td>Associate in Science</td>
<td>30 / 59%</td>
<td>21 / 41%</td>
<td>51 / 16%</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>139</td>
<td>324</td>
</tr>
</tbody>
</table>
Although some variation did exist in the degree sought and preference for learning style, the largest majority of students in both degree seeking status appeared in the field independent category.

Perhaps the reason a student is attending college full time versus part time has something to do with their learning style preference. The surveys showed that 81% of the students in this research were full time students and only 19% were part time students. The percentage of full time and part time students who classified themselves as field independent was 57% while those students who classified themselves as field dependent was 43% for both part time and full time. Figure 12 is provided to display this difference in full time and part time student status and preference for the field independent learning style. This information is also provided in table format for ease in comparison of the percentages.

Figure 12: Full Time And Part Time Status and Preference For Field Independent Learning Style
Figure 13 is provided to show the difference in the preference for field dependent learning style and full time or part time status.

Figure 13: Full Time And Part Time Status and Field Dependent Learning Style

Table 4 is made available to easily compare enrollment status and learning style preference.

Table 4: Full Time or Part Time Status and learning Style Preference

<table>
<thead>
<tr>
<th></th>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Time Status</td>
<td>151 / 57%</td>
<td>113 / 43%</td>
<td>264 / 81%</td>
</tr>
<tr>
<td>Part Time Status</td>
<td>34 / 57%</td>
<td>26 / 43%</td>
<td>60 / 19%</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>139</td>
<td>324</td>
</tr>
</tbody>
</table>
It is observed from Table 4 that in this research, learning style preference and full time or part time student status had a negligible impact.

**Hypothesis Testing and Quantitative Analysis**

A hypothesis is a tentative, testable position regarding the expected outcome of a study (Wiseman, 1999, p. 547). The hypothesis that was tested for this research involved honors and/or gifted students and non-honors students and explored the prospect of assessing the learning style preference for these students based on the Group Embedded Figures Test (GEFT). The null hypothesis assumed there was no association between honors and/or gifted students and their preference for field independency. The alternative hypothesis assumed there was an association between preferring field independent learning styles and being an honors and/or gifted student.

There are several methods to analyze data based on the type of data that is generated by research. The goal of this analysis was to discover if there was significance in the research findings, that is, whether the findings of the study were significant or could have occurred by chance alone. While percentages do allow some analyses regarding the difference in variables, percentages do not give us any indication of whether these variables are significant. The Chi Square Goodness of Fit \((\text{chi}^2)\) calculation provided some important information regarding the impact of the surveyed variables and the relationship that they have with preferred learning styles. This statistical test was chosen for the analysis of the data obtained in this research. A narrative of the results will also be provided for each of the variables analyzed.
Variables and Chi Square Calculations (Chi \(^2\))

Several different variables were examined using the Chi Square calculation (Chi \(^2\)). These variables included honors student status, gender, race, age of the student, whether the student was seeking an Associate in Arts or an Associate in Science degree and if the student was attending Valencia on a part time or full time status.

For students to have been accepted into the honors program means that they met at least one of several criteria. These criteria included:

1. top 10% of high school graduating class
2. cumulative high school GPA of 3.5+ on a 4 – point scale
3. ACT composite score of 26 or above
4. SAT score of 1170 or above
5. CPT (college level placement test) score of 100 or above on writing, 97 or above on reading, 90 or above on elementary algebra and 50 or above on college level math
6. cumulative Valencia GPA of 3.25 or above with a minimum of 12 credit hours of Valencia college level coursework (Clyburn & Thomas, 1999, Sept).

An honors student has a choice of obtaining either an honors certificate or an honors degree. There are different requirements to be met depending on which type of degree the student is seeking. To receive the honors certificate, the student must complete at least 12 hours of selected honors coursework and have at least a 3.0 cumulative GPA. To receive the honors degree, the student must complete at least 24
hours of selected honors coursework and have at least a 3.25 cumulative GPA. Do all of these criteria indicate that there is a significant difference in learning style preference for the students who are placed in the Honors program and decide to pursue and Honors Degree?

There was a total of 337 students who were administered the Group Embedded Figures Test (GEFT). Of that number, only 324 students completed the surveys successfully so these are the surveys that are included in this research. Table 5 shows the results of the first Chi Square Goodness of Fit Test (Chi²).

Table 5: Chi² Test of Honors and Non-Honors Students and Preference for Field Independent or Field Dependent Learning Style

<table>
<thead>
<tr>
<th></th>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honors Student</td>
<td>75 / 70.8</td>
<td>49 / 53.2</td>
<td>124</td>
</tr>
<tr>
<td>Non-Honors Student</td>
<td>110 / 114.2</td>
<td>90 / 85.8</td>
<td>200</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>139</td>
<td>324</td>
</tr>
</tbody>
</table>

The value of Chi² (\(\chi^2\)) was .9397. The degrees of freedom (df) = 1. The probability value (P-value) was .33. This indicates that the results were not statistically significant at the .05 level. The probability value of .33 means that there was a 33% chance of getting a Chi – Square value of .9397 by chance alone assuming the null hypothesis is true. The null hypothesis (\(H_0\)) must be rejected for this variable. This calculation allowed that learning style and honors status are not statistically dependent.
Even though honors status and learning style were not statistically dependent, maybe there was another variable that was. A Chi Square Goodness of Fit (Chi $^2$) test was performed on the variable of gender. Table 6 has the breakdown of this calculation.

Table 6: Chi $^2$ Test of Gender and Preference for Field Independent or Field Dependent Learning Style

<table>
<thead>
<tr>
<th></th>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>50 / 48.5</td>
<td>35 / 36.5</td>
<td>85</td>
</tr>
<tr>
<td>Females</td>
<td>135 / 135.5</td>
<td>104 / 102.53</td>
<td>239</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>139</td>
<td>324</td>
</tr>
</tbody>
</table>

The value of Chi $^2$ ($\chi^2$) was .1399. The degrees of freedom (df) = 1. The probability value (P-value) was .708. The probability value of .708 means that there was a 70.8% chance of getting a Chi-Square value of .1399 by chance alone. As is evident in Table 6, there was not a significant difference between expected and obtained numbers for the variable of gender and preference for field independent or field dependent learning style. This indicates that the results were not statistically significant at the .05 level.

Although preference for field independent or field dependent learning styles did not show significance for either being and honors student or for gender, perhaps there might be significance for preference based on one's race. Table 7 delineates the preference for field independent or field dependent learning style based on race. The value of Chi $^2$ ($\chi^2$) was .6125. The degrees of freedom (df) = 3. The probability value
(P-value) was .89. The probability value of .89 means that there was an 89% chance of getting a Chi-Square value of .6125 by chance alone. As can be clearly seen from the graph, there were no significant findings based on race alone, and as such the results obtained in this study were not statistically significant based on learning style preference and race at the .05 level.

Table 7: Chi² Test of Race and Preference of Learning Style

<table>
<thead>
<tr>
<th></th>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>140 / 142</td>
<td>108 / 106.39</td>
<td>248</td>
</tr>
<tr>
<td>Black</td>
<td>14 / 13.13</td>
<td>9 / 9.87</td>
<td>23</td>
</tr>
<tr>
<td>Hispanic</td>
<td>20 / 20.56</td>
<td>9 / 9.87</td>
<td>23</td>
</tr>
<tr>
<td>Other</td>
<td>11 / 9.70</td>
<td>6 / 7.293</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>139</td>
<td>324</td>
</tr>
</tbody>
</table>

If race has no bearing on whether one demonstrates a preference for field independent or field dependent learning styles, then perhaps age will. The survey form was actually broken down into four different age ranges but due to the scarcity of individuals over the age of 29 filling out the surveys, the age group 29 – 35 and over 36 were combined together. Table 8 clearly shows the relationship between age and preference for a field dependent or field independent learning style.
Table 8: Chi $^2$ Test of Age Range and Preference for Field Independent or Field Dependent Learning Style

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ages 16 - 22</td>
<td>141 / 142.74</td>
<td>109 / 107.2</td>
<td>250</td>
</tr>
<tr>
<td>Ages 23 – 28</td>
<td>33 / 28.54</td>
<td>17 / 21.45</td>
<td>50</td>
</tr>
<tr>
<td>Ages 29 and over</td>
<td>11 / 13.70</td>
<td>13 / 10.29</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>139</td>
<td>324</td>
</tr>
</tbody>
</table>

The value of Chi $^2$ ($\chi^2$) was 2.91. The degrees of freedom ($df$) = 2. The probability value (P-value) was .233. The probability value of .233 means that there was a 23.3% chance of getting a Chi – Square value of 2.91 by chance alone. This variable also showed no significance and the results obtained were probably obtained by chance.

It is possible that the learning style preference of students somehow affects the academic degree that the student is seeking. Table 9 reveals at the relationship between those students that are seeking an Associate in Arts degree and those that are seeking an Associate in Science degree and the preference in learning style.
Table 9: Chi² Test of Degree Desired and Learning Style Preference

<table>
<thead>
<tr>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associates in Arts</td>
<td>155 / 155.88</td>
<td></td>
</tr>
<tr>
<td>Degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associates in</td>
<td>118 / 117.12</td>
<td>273</td>
</tr>
<tr>
<td>Science Degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>139</td>
</tr>
</tbody>
</table>

The value of Chi² (χ²) was .735. The degrees of freedom (df) = 1. The probability value (P-value) was .786. The probability value of .786 means that there was a 78.6% chance of getting a Chi-Square value of .735 by chance alone. This variable shows no significance and there is a good probability that the results that were obtained, were obtained by chance. It does not appear that the degree that is desired by the student is influenced in any way by the students' preferred style of learning.

One more variable that was analyzed through the completed survey forms. This variable indicated the enrollment status of the student, that is, whether the student was attending school on a full time or a part time basis. Table 10 provides a look at enrollment status and learning style preference.
<table>
<thead>
<tr>
<th></th>
<th>Field Independent</th>
<th>Field Dependent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Time Student</td>
<td>151 / 150.74</td>
<td>113 / 113.26</td>
<td>264</td>
</tr>
<tr>
<td>Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part Time Student</td>
<td>34 / 34.26</td>
<td>26 / 25.74</td>
<td>60</td>
</tr>
<tr>
<td>Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>139</td>
<td>324</td>
</tr>
</tbody>
</table>

The value of Chi² ($\chi^2$) was .0056. The degrees of freedom ($df$) = 1. The probability value ($P$ - value) was .9402. The probability value of .9402 means that there was a 94.02% chance of getting a Chi – Square value of .0056 by chance alone. There was no significance between the enrollment status of the student and learning style preference. The results that were obtained could have been obtained by chance.

The results of the statistical analysis components of the research have been discussed in detail in this chapter. The discussion of these findings, implications of these findings and future directions for further study, are presented in Chapter 5.
CHAPTER FIVE

SUMMARY OF RESULTS AND DISCUSSION

Introduction

The purpose of this research was to determine if there was a significant difference in the learning style preferences of honors versus non-honors students based on the administration of the Group Embedded Figures Test (GEFT). This research was performed using several different classes of students at Valencia Community College – East Campus in Orlando, Florida. Students were administered the GEFT and then asked to complete a survey after listening to an explanation of what the test was measuring and how the test could be useful to enhance their future academic careers.

The students were asked to answer questions regarding their preferred learning style as assessed by the GEFT. The students were asked to respond to several questions. One of the questions referred to honors/non-honors student status. Demographic information that was obtained included information regarding gender, age, ethnic background, full time or part time student status and desired degree. The students surveyed were in many different disciplines including general psychology, developmental psychology, abnormal psychology, speech, computer science, student success classes, preparatory classes, science classes and mathematics classes. This chapter summarizes
the major findings of this research and discusses the implications of the results. Suggestions for future research are discussed.

**Study Overview**

There were several objectives in conducting this research. Instructors at all levels of education have encountered the situation where one class is able to stay “on task” and complete the outlined syllabus while another class is unable to complete even the rudimentary fundamentals of the course outline. This situation becomes frustrating for the student as well as the instructor when the course work is left incomplete and then the student has a difficult adjustment to the next sequence level. If learning style preferences could be ascertained quickly and definitively, perhaps the instructional material could be presented in such a way as to allow the students to master the concepts and be able to successfully move on to other material. It was considered a possibility that a particular group of students, such as the honors and/or gifted student, may have like preferences for learning. If this were the case, then a class could conceivably be conducted in a manner that would produce success for the majority of the students participating in the class.

The honors and/or gifted student was chosen because there has been very little research conducted that has targeted this specific group on learning style preferences. In fact, there are many misconceptions regarding this particular group and their ability to understand and retain information. Many of these misconceptions revolve around the idea that the honors and/or gifted student needs no elaboration of material or other types of interventions for them to assimilate the information they are attempting to learn. It is
also mistakenly believed that they will succeed and graduate when in fact this group of students have many unmet needs in the classroom and are just as likely to drop out as other students (Harrigan, 1998, Blackburn & Erickson, 1986, Lovecky, 1986). It is because of these reasons that this research was carried out. Every student deserves the chance to succeed in the classroom; sometimes academic success is harder to come by.

Results

The first inquiry in this study related to whether or not there were more college students who had a preference for a field independent learning style or a field dependent learning style. The students answered this question themselves after having been administered the Group Embedded Figures Test (GEFT). A total of 337 Group Embedded Figures Tests were administered. Of that number, 324 students properly filled out the survey forms. These completed surveys were the ones that were used to assess who would be classified as field independent or field dependent. Analysis of the percentages revealed that of the students surveyed, 139 or 43% of them were classified as field dependent while 185 or 57% of the students were classified as field independent according to the GEFT. These percentages indicated that there were more students at Valencia Community College – East Campus who had a preference for the field independent learning style rather than the field dependent learning style. These results could be rationalized by examining the disciplines where the surveys were conducted.

Individuals with a preference for the field dependent learning style tend to favor classes that involve other people and human relations (Herold, 1974). The classes that
would favor field dependent learning style would include developmental psychology, abnormal psychology, education classes, student success classes, political science classes, and speech classes. These classes were part of the survey.

Individuals with a preference for the field independent learning style tend to favor classes that require analytic skills and less people involvement (Herold, 1974). The classes that would favor the field dependent learning style would include mathematics classes, computer classes, and science classes. These classes were also part of the survey.

Since classes that involve both field dependent and field independent learning style preferences were involved in the survey, there should have been students with preferences in both learning style categories.

The second inquiry concerned the frequency distribution of students who take honors and/or gifted classes and are also field independent based on the results of the Group Embedded Figures Test (GEFT). The percentage of students who took honors and/or gifted classes and also preferred the field independent learning style was 40%. The percentage of students who classified themselves as honors and/or gifted and classified themselves as field dependent was 35%. Although the percentages given here indicate that there was a preference for field independent learning style, it would be difficult to say there was a significant difference without more analysis.

Tabulating a probability value using the Chi Square Goodness of Fit (\(\chi^2\)), it was found that the results obtained were not statistically significant at the .05 level. It is likely that the results that were found, would be found 35% of the time, under other circumstance. The null hypothesis must be rejected for this variable. The honors and/or
gifted student was no more likely to prefer a field independent learning style than any other student.

This finding demonstrates that any student is capable of being an honors and/or gifted student regardless of what learning style is preferred. Some instructors and students believe that the honors and/or gifted student possess a special ability to learn.

The third inquiry was about the percentage of students enrolled in non-honors classes who could be labeled field dependent versus field independent. Examining the percentage of this particular statistic validates the finding for the second inquiry. It was found that 65% of the students who preferred the field dependent learning style were in non-honors classes while 60% of the students who preferred the field independent learning style were enrolled in non-honors classes. According to the probability–value of .33, there is a 33% likelihood that the results were random and that non-honors status and learning style were not statistically significant. Students with field dependent learning style preferences were just as likely to take an honors and/or gifted class as are the students who preferred field independent learning styles.

The fourth inquiry concerned an association between learning style preference and gender. The data revealed that of the 185 students who had a preference for a field independent learning style, fifty or 27% were male and 135 or 74% were female. For the 139 students who indicated that they preferred the field dependent learning style, thirty-five or 25% were male and 104 or 75% were female.

Further analysis of these percentages reveal that there was a strong probability (70%) of getting the Chi Square Goodness of Fit (Chi$^2$) value of .1399 by chance alone.
As tabulated, there was no significant difference in gender in preferring a field independent learning style or field dependent learning style. This result may have been affected by the fact that there were so few males that took part in the survey. Of the 324 usable pieces of data that were collected, only 85 surveys were completed by males. This unequal distribution of male to female respondents may have had an impact on the data and the subsequent analysis.

The fifth inquiry dealt with the frequency distribution of the students who took honors and/or gifted classes and were field independent learners based on the student’s race and age. The completed survey categorized four different races: Caucasian, African-American, Hispanic, and Other. Of the students surveyed, 57% preferred the field independent learning style. Of those students, 76% were Caucasian, 7% were African-American, 11% were Hispanic and 6% were Other. The rest of the students, 43% preferred the field dependent learning style. Of these students, 78% were Caucasian, 6% were African-American, 12% were Hispanic, and 4% were Other.

Scrutinizing these percentages more closely, it was found that the probability of obtaining the percentages that were obtained was 89%. Again there was no statistical significance in the findings based on race. A possible explanation for this finding is that once a student has reached the community college setting, he/she has determined what methodologies of study work for him/her and those methods are retained and refined to enhance the academic career and learning style preference has little impact on the success that a student has in the community college.
The age of an individual may have determined what learning style is preferred. The age ranges on the survey included 16 - 22; 23 - 28; and 29 and over. There was little difference in the percentages of students in either group. In analyzing the groups, 76% of the students who preferred field independent learning style were in the 16-22 year old age range, while 18% were in the 23 – 28 year old age range and 6% were in the 29 and over age range. In the group of students who preferred the field dependent learning style, 78% of them were in the 16 – 22 year old age range, 13% were in the 23 – 28 year old age range and 9% were in the over 29 year old age range. This data may have been biased simply because of the college setting. In 1997, 64% of the college students were under the age of 25 (U. S. Department of Education, Office of Educational Research and Improvement, 1999). This means that only about 36% of all college students are over the age of 25. It would be difficult to determine if age was a major factor in determining whether one had a preference for learning style based on the results obtained at a college simply because the population age range is limited. Age may be a factor that determines preference for learning style early in life, but by the time a student reaches the community college, age may no longer be that important. Dunn & Griggs (1995) felt that preferences for learning style would change with age. It may be that the change in preference takes place very early in life or very late. For many individuals, what purpose would be served to change something that is effective? If a student has learned to assimilate information effectively using a learning style that is comfortable, why should change occur?
Since information had been gathered in a survey format, students also gave information regarding which degree they were seeking. Valencia Community College awards Associate in Arts degree, Associate in Science degrees, Associate in Applied Science degrees and numerous certificate programs. There were 185 students who preferred the field independent learning style, and of that number, 155 students, or 84% desired to obtain an Associate in Arts degree; and thirty, or 16% desired to obtain an Associate in Science degree. There were no other degrees were being sought by the students. There were 139 students who preferred the field dependent learning style, and of that number 118, or 85% desired the Associate in Arts degree and 21, or 15% desired the Associate in Science degree. Again there were no other degrees being sought by the students.

If there was any significance in this finding, then perhaps a student chooses a degree based on their preferred learning style. The Chi Square Goodness of Fit value (Chi $^2$) was .735. The probability – value was 78.6%. This value indicated that 78.6% of the time a study of this type would be conducted, this $\text{Chi}^2$ value would be found, therefore no significance can be found in the type of degree being sought and preferred learning style.

One possible explanation for the lack of significance in the findings regarding learning style preference and major may simply be that the students may not be sure of the direction that they are taking. The University of North Dakota counseling center has found that although 80% of the entering freshman have decided on a major, over 50% of them change their majors before they graduate (Home Page, 2001).
College has many FTIC (first time in college) students, so it is not unreasonable to assume that the students who took the Group Embedded Figures Test (GEFT) and completed the survey will change the major that they have chosen prior to graduation.

There was one other dimension in the survey that was examined. This dimension was whether the student attended college on a full time or part time basis. There were 185 students who preferred the field independent learning style. Of this number, 151 or 82% were full time students and 34 or 18% were part time students. There were 139 students who preferred the field dependent learning style. Of this number, 113 or 82% were full time students and 26 or 18% were part time students. When the Chi Square Goodness of Fit (Chi $^2$) test was performed, it was found that that this value was .0056 and the probability –value (P-value) was .9402. Since the Chi $^2$ value could be obtained randomly 94.02% of time, this was not considered to be a significant variable. There was no significance in whether a student attended college on a part time or full time basis and the learning style that they preferred.

**Discussions and Recommendations**

This study did not find any significant differences in the preference of learning styles as assessed by the Group Embedded Figures Test (GEFT) and honors and/or gifted students versus non-honors students. According to the results obtained in this study, there was no difference in preference for field independent versus a preference for field dependent learning style in the honors and/or gifted student. Honors and/or gifted students were just as likely to prefer field independent learning styles as they were to
prefer field dependent learning styles. Instructors should not assume that because they are instructing an honors and/or gifted class that activities should be limited in any way. In fact, what this study does indicate is that more learning options should be provided for all students so that the strengths of each student are tapped by the learning activities.

Since the student who has a preference for the field independent learning style favor independent activities and unstructured learning situations, and the student who has a preference for the field dependent learning style favor class discussion and more direct supervision, both of these approaches should be offered in class. Opportunities for preferred learning situations could be offered to all students on different days so that every student is able to reach their academic goal.

This study also found no significant difference in preference of learning style as assessed by the Group Embedded figures Test (GEFT) and gender. This is an interesting finding for many reasons. The GEFT developers, Philip Oltmans, Evelyn Raskin and Herman A. Witkin did make it a point that the norms that are used for scoring of the test are only applicable to individuals who come from similar populations and that for all other people, the norms serve only as a general guide. Since this instrument was developed in 1971, there has been a change in how intelligence has been viewed and there has been a concerted effort to increase the perceptual ability of all children. Prior to the 1970’s, children’s textbooks were often gender biased with sexually stereotyped abilities (Woolfolk, 1995). Studies that were conducted prior to 1974 showed that males performed significantly better than females (Woolfolk, 1995). However, since that time, the differences have virtually disappeared, except on tests that require mental rotation of
a figure in space, and this difference is often attributed to the male participation in athletics (Linn & Hyde, 1989). Since the Group Embedded Figures Test does contain some attributes of spatial-like tasks, the fact that there is no significant difference between genders can be seen as a positive transition towards decreasing that significant difference between males and females on spatial ability tasks.

There were no significant findings in the area of ethnic background and preferred learning styles for this study. The Chi Square Goodness of Fit Test (Chi$^2$) confirmed this finding.

This study did not find any significant differences in the preferred learning style based on age ranges. This particular characteristic may be explained in a number of ways. One of the simplest explanations could be that by the time a student has reached college age he/she has learned to adapt and accommodate a preferred learning style. There may be more variation in a younger age range than in the older age ranges. Learning style generally develops out of a preference for processing and organizing information and may have nothing to do with the age of the person involved. The Group Embedded Figures Test may be better utilized in younger children to assist them in learning how they best assimilate information.

There was no significant finding between learning style preference and desired degree. Since Valencia Community College only offers Associate degrees, this finding may be changed if the different disciplines were taken into account. Those individuals that prefer a field independent learning style may choose a discipline that matches the preference they have for less direction and desire to work alone. The individual that
prefers a field dependent learning style may choose a discipline that allows them to work closely with people. This research would require a different wording of the question on the survey than the one that was asked. This is one area that significance might be established with a minor adjustment.

The study also analyzed college enrollment and preferred learning style. Many students attend college on a part-time basis and work full-time. Many other students attend college full-time and work either full or part time. There is a great deal of variation in the enrollment pattern at a community college. This study showed no significance in enrollment and preferred learning style.

An advantage in attending a community college is the reduced cost of an education (Office of Institutional Research, 2000). Students who attend a community college frequently work either part time or full time in order to make payments. Students who participated in this study were more likely to be full time students. There may have been a significant difference in preferred learning styles if there had been more part time students involved in the study.

Implications For Further Study

There are several areas of this study that warrant further research. Learning style research has grown out of the studies that have suggested that individuals differ in the way they process information (Woolfolk, 1995). Instructors are well aware that there are students who respond very quickly to new information and there are also those students
who take more time with new information before they feel that they understand it. Some areas where additional research could be concentrated include:

1. Further study should be accomplished to determine if there is a particular style of learning that is preferred by most students who take honors and/or gifted classes. The style of learning may not be classified as field independent or field dependent, but there may be some other variable that has been disregarded.

2. This study surveyed many different students enrolled in a variety of courses at Valencia Community College - East Campus. An assumption was made that the self-report by the students would be accurate. A closer investigation of the students in this study may find that there were differences in the self-report and actual preferred learning style by the students due to misunderstandings or attitudes.

3. This study was conducted only on one campus of Valencia Community College. Valencia actually has several campuses and each campus has a variety of program offerings. Valencia Community College - East campus has more of the fine arts programs and computer related areas then the other campuses. This specific campus testing may have had some impact on the outcome of this study and next time more campuses should be involved to not only have a bigger sample size but a more diverse population of students.
4. The survey results of the Group Embedded Figures Test were obtained at different times throughout the semester. The first results were obtained within the first week of the session and the last results were obtained at the end of the semester. This may or may not have had an impact. If all the surveys had been taken at the same period of time in the semester, there is less probability of extraneous variables interfering with the data. For example, anticipation of Spring Break may have led some students to hurry through the Group Embedded Figures Test (GEFT), and they may not have been concentrating as much as they should have been on the assignment at hand.

5. Although there were no significant findings in this study based on the Group Embedded Figures Test, the addition of another instrument may have provided answers to the question about what is it about the style of learning that makes a student a honors and/or gifted student. The addition of the Myers-Briggs Type Indicator or the Barsch Learning Style Preference Form may be the impetus to help students discover the learning style that works best for them.

It is not only important for students to understand their learning style preferences, but it is also important for the teacher to understand what learning style actually denotes. Teachers who are aware of how students learn can provide the type of environment where maximum learning can take place. This should be what teaching is all about.
APPENDIX A

Ordering Information for Group Embedded Figures Test
GROUP EMBEDDED FIGURES TEST

BY:

Philip K. Oltman, Evelyn Raskin, and Herman A. Witkin

This test may be ordered from:

Consulting Psychologists Press, Inc.

www.cpp-db.com

The Group Embedded Figures Test (GEFT) is administered in group settings.

It is a 32-page non-reusable booklet that can be completed in 20 minutes.
APPENDIX B

Informed Consent Form
Informed Consent Form

My name is Debra Hollister. I am a doctoral student in curriculum and instruction at the University of Central Florida. I am also a teacher at Valencia Community College. You are being asked to participate in a research project that I will use to complete my doctoral studies at the university.

Procedure
This is NOT a test. It is an assessment and a survey or self description that can be used by you to help identify your preferred learning style. You will be asked to complete an assessment and then you will then be asked to fill out a self report survey. The results of assessment will be explained to you as to what it means to you as a student. There will be no compensation for your participation in this study.

The information which is obtained by this study will be used to determine what type of learning style is predominant in specific classes.

Protection of Privacy
It is important to you and to me that your privacy be protected. There is no information regarding your name and/or other identifiable numbers requested. The study will only report group information and there will be no individual information given in the dissertation report.

You may choose TO NOT PARTICPATE in the study at any time and there will be no penalty for that choice. You may also choose not to answer any question that you deem to be disturbing.

I have read the above information and I agree to participate in this assessment procedure. I have received a copy of this description.

--------------------------------------------------------
Signature
--------------------------------------------------------
Print Name

Date

Debra Hollister, Professor
Mail code 3-29
Valencia Community College
407/299-5000 xt 2399
APPENDIX C

Student Survey
To: Research Participants  
From: Debra L. Hollister

Thank you for taking the time to fill out the attached survey. You will notice there are several demographic items which I need to have you answer as part of my study. Please answer each item to the best of your ability. The results will be kept confidential and will not be used outside of the confines of this project.

Please circle the response that is most applicable to you.

| 1. Sex: | Male | Female |
| 3. Full Time Student | Part Time Student |
| 4. Academic Goals: | Associate in Science | Associate in Arts | Other |
| 5. Field Dependent | Field Independent |
| 6. Have you taken or will you take Honors classes? | Yes | No |
| 7. Name of this class: |  |
| 8. Ethnic Group: | Caucasian | Black | Hispanic | Other |
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