A COMPARISON OF PRIVATE PILOT FLIGHT TRAINING HOURS FOR TWO AGE GROUPS

By

PAUL ALLEN BURRELL

Bachelor of Science In Agriculture

Oklahoma State University

Stillwater, Oklahoma

May, 1987

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
In partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
May, 1989

[redacted]

[redacted]

[redacted]

Robert E. Nolan

[redacted]

ACKNOWLEDGMENTS

The writer wishes to express appreciation to Dr. Janice Williams, Dr. Mel Miller and Dr. Bob Nolan. Dr. Williams' help and expertise with statistics was most helpful and made the research flow very smoothly. Dr. Miller was very supportive as an adviser and Dr. Nolan served very willingly as a committee member.

A very special thanks is extended to Dr. Kenneth Wiggins for his time and expertise as a committee member as well as the financial support, encouragement and prodding as a colleague and friend as this help was most instrumental in the completion of this project.

This project, as well as many others, would not have been attempted without the never ending support and love of Bryan and Sue Burrell and it is to them that this study is dedicated.

TABLE OF CONTENTS

Chapter Page

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

In March of 1910 when the fragile looking Curtiss Pusher rose from the ground to an altitude of 25 feet for a flight of less than one mile, the first flight in Oklahoma was not taken lightly. Neither is the aviation industry in Oklahoma taken lightly today. Oklahoma is the home of aviation pioneers like Clarence E. Page, pilot and businessman, Will Rogers and Wiley Post, aviation entrepreneurs; Paul Braniff, founder of Braniff Airlines and many others. Astronauts Stafford, Cooper, Roosa, Garriott, Pouge and Lucid, all from Oklahoma, have logged more hours in space than astronauts from any other state. These early pioneers of aviation surely had no idea that Oklahoma would become one of the leading aviation related states in America (Oklahoma Aeronautics Commission, 1987).

Oklahoma is not only the home of many major aviation industries such as Tinker, Vance and Altus Air Force Bases, American Airlines fleet maintenance, Rockwell International, McDonnell Douglas, Gulfstream Aerospace and Avia Tech, but it also plays a very important educational role in aviation. The Mike Monroney Aeronautical Center in Oklahoma City trains all Federal Aviation Administration air traffic controllers. In addition, Oklahoma has several Colleges, Universities, Vocational-Technical schools and private companies that offer a wide variety of education and training for the aviation industry (Oklahoma Aeronautics Commission, 1987).

According to the Department of Transportation and the Federal Aviation Administration (FAA) (1987), aviation activity is forecast to increase substantially

over the next two decades not only in Oklahoma but world wide. Continuing growth in the number of aircraft operations, number of aircraft, enplanements, diversity of operations, and sophistication of aircraft will place unprecedented demands on the National Airspace System, the Federal Aviation Administration and airplane manufacturers to name a few. Meeting this challenge requires improved and expanded services, additional facilities and equipment, improved and expanded work force productivity, and the replacement of aging equipment. In addition the full effects of the Deregulation Act of 1978 and the resulting increase in competitive scheduling, lower prices, new airline entries, and airport hubbing will continue to place extra demands on the system. Along with these changes in the aviation industry comes an increasing demand for quality personnel in the areas of pilots, mechanics, flight attendants, baggage handlers, ticket counter staff, air traffic controllers, aviation inspectors and many more.

Aircraft operations, including takeoffs and landings at all major airports are anticipated to grow by 42 percent between 1982 and the year 2000, with itinerant operations increasing 66 percent. Flight operations that operate on an Instrument Flight Rules flight plan are expected to increase by 76 percent. Air carrier domestic enplanements are expected to increase by 159 percent and commuter enplanements by 255 percent. Air carrier hours flown are forecast to increase 110 percent. The number of air carrier aircraft is expected to increase by 72 percent, commuter aircraft by 57 percent, general aviation by 4 percent, and the helicopter fleet by 29 percent. While all of this increase in aircraft fleet is forecast to take place, the number of pilots is forecast to decrease by 4 percent but those with an instrument rating are expected to grow by 7 percent (United States Department of Transportation, 1987).

For the most part the major airlines in the United States and world-wide have no problem finding qualified pilots. The files of personnel offices for the major airlines

are crammed full of applications and resumes of pilots aspiring to command their big, modern equipment, to make the big money, to enjoy the time off and to look forward to a generous retirement. The major airlines are drawing from the pilot pool, which until recently was adequately filled with well trained and experienced military pilots. Military pilots are viewed as potential hires by the aviation industry, however, due to the high cost of training, the military is trying very hard to retain the pilots on whom it has spent literally millions of dollars. In addition the number of pilots that the military is training is down in times of world peace. Furthermore, major airlines have a high percentage of pilots who were trained during the Southeast Asia conflict and are nearing mandatory retirement age. Along with military pilots, the major airlines draw from the more experienced pilots from the regional and commuter airlines and the corporate aviation flight departments. Consequently, the regional and commuter airlines and the corporate flight departments are faced with a very high rate of pilot turnover. When a pilot flies for a short period with a commuter airline and builds a good deal of turbine flight hours, he is looked at to be hired by the major airlines (Parke, 1988).

The major airlines require that all of their pilots have a four year college degree, be in excellent physical condition as well as having all of the appropriate certificates and ratings. Until recently a degree in aviation was unavailable and even now the degree is one of the more expensive university degrees, largely due to the high cost of flight training involved. In part, this is because the equipment required for the flight training is very sophisticated and expensive to buy and/or rent for training. In addition to equipment, there is the hourly instructor fee. Due to the high cost of training, there are constant efforts to reduce the amount of training without compromising the competency or safety level of the newly trained pilot (Brown, 1988; Bougue, 1985; Holden, 1984; Smith, 1984).

Statement of the Problem

The problem of the study was that the high cost of flight training is prohibiting many college students from choosing aviation as a major.

Purpose of the Study

The purpose of the study was to collect data from Oklahoma State University Aviation and Space Education Private Pilot training records for the period of 1986-1988 on all students that completed a private pilot's certificate course to determine if age had a significant affect on the cost of completion.

Need for Study

There have been very few, if any studies done in the specific area of age as it relates to flight training. Researching the age of flight training students and the number of hours needed before pilot certification will provide information to determine if there is an optimum age for university level flight training and thus reduce the cost of such training.

Definitions

For the purposes of this study the following definitions were used:

Dual hours refers to that flight time that the student is accompanied in the airplane with the flight instructor and is receiving instruction.

Solo hours refers to the flight time that the student is the sole occupant of the aircraft.

Hypotheses

The null hypotheses states that there is not a significant relationship between age and the total number of flight training hours needed for the competency level required to pass the Federal Aviation Administration Private Pilot certification checkride.

Assumptions

The following assumptions were made in conducting this study:

1. All flying done prior to the Federal Aviation Administration checkride was done solely for the purpose of improving the students competency level needed to pass the checkride.

2. The students had the finances needed to finish all required flight training as it became necessary.

3. Flight training was conducted on a regularly scheduled basis, following the FAA approved syllabus.

4. The student was trained primarily by one flight instructor from start to finish with the exception of the periodic required stage checkrides with the chief flight instructor.

Limitations

This study is limited to students in the Oklahoma State University Aviation and Space Education department students only and is not necessarily generalizable to other flight training programs. In addition there are variables involved in flight training including weather, frequency of training, quality of instruction and instructor experience and student motivation that the researcher was unable to control for this study.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The Costs of preparing pilots to operate safely and effectively in the changing aircraft and systems are becoming prohibitive (Roscoe, 1980). Aviation technology has developed so rapidly that little effort has been devoted to flying and flight training. The rapid changing of the industry brings constantly changing regulations from the Federal Aviation Administration which are designed to solve a problem. Often solutions to existing problems create new problems, which in turn are solved by new regulations. The regulations from the FAA govern flight operations as well as pilot training. The problem of training new pilots and retraining current pilots to facilitate the implementation of new regulations and procedures is just beginning to be recognized and the increasing complexity of aviation operations and airborne systems combined with the increasing demands in the society for safety, dependability, economy, and reduced energy consumption place mounting pressures on the aviation community (Roscoe, 1980).

Federal Aviation Administration Regulations

The FAA prescribes through Federal Aviation Regulations (1989) the requirements which must be met before a person is certificated as a pilot. These requirements include the applicant's physical condition, aeronautical experience, knowledge, and skill. Federal Aviation Regulations, Part 61, prescribe the minimum

aeronautical experience required for each grade of pilot certificate or rating. The pilots training experience is accounted for in a pilot log book which indicates the number of flight training hours, both dual and solo. When the flight instructor believes that the student is trained well enough, the student will take a certification checkride with an FAA representative. During this certification flight check, an applicant must demonstrate a satisfactory level of skill in the required pilot operations as outlined in the FAA Flight Test Guides (Olcott, 1987). According to the United States Department of Transportation (1977), the following criteria determine if an applicant for an FAA Private Pilot certificate is able to perform the operation required:

1. Performing procedures and maneuvers within the aircraft's performance capabilities and limitations, including use of the aircraft systems.

2. Demonstrating emergency procedures and maneuvers appropriate to the aircraft in an orderly fashion.

3. Controlling the aircraft with smoothness and accuracy.

4. Exercising proper pilot judgment.

5. Applying aeronautical knowledge.

6. Showing that the applicant is the master of the aircraft, with the successful outcome of a procedure or maneuver never seriously in doubt.

The FAA does set a minimum number of flight training hours required before a student pilot is eligible to take the FAA certification ride but it does not place any significance or priority on applicants who have more than the minimum number of flight training hours required. On the other hand many people and organizations such as pilot employers and insurance companies measure pilot ability and safety potential by the number of hours in the pilot's logbook (Olcott, 1987).

For FAA approved flight schools operating under Federal Aviation Regulations Part 141, the minimum number of flight training hours that a Private Pilot applicant

must have is thirty five. Twenty hours must be dual instruction given by a Certificated Flight Instructor and fifteen hours must be solo (Federal Aviation Administration Regulations, 1989).

Flight Training

Flight instruction is an easy way for low time pilots who are hoping to get a professional flying job to build flight time that is required by the airlines and corporate flight departments. Some flight instructors teach flight instruction because they enjoy teaching but many Certificated Flight Instructors give flight instruction only until they build enough flight time to get a more lucrative job flying larger aircraft. When this is the case the quality of flight instruction sometimes suffers. In addition flight instructors make very small wages and are paid on an hourly basis only when instructing. Flight instructors are commonly described as disinterested, inexperienced, underpaid, overworked, juvenile and on their way to somewhere else (Collins, 1984).

Most books that deal with education techniques tend to use somewhat complicated language and are based on the education of children in a classroom setting. The setting of flight instruction is very different; the students are adults for the most part and the setting is usually on a one-to-one basis and the cockpit of a noisy airplane poses several threats to the communication process (Kershner, 1985).

The rate of learning does vary from student to student. According to Kershner (1985) there are five reasons that the learning rate varies between flight training students. These are:

1. Intelligence. The intelligence of a flight student should be readily apparent to the instructor and the more intelligent students will not need the repetition. On the other hand if the student has problems grasping the most elementary ideas, then the instructor can plan on less than spectacular performance from the flight student.

2. The Instructor's Technique. The instructor can directly control the rate of learning by the individual instructing technique.

3. Fear and Anxiety. Some instruction is performed on the basis that fear and anxiety helps people learn. This belief is one of the biggest fallacies existing in flight instructing. At all times the flight instructor should work to alleviate any feelings of fear or anxiety and strive to make the student as comfortable and relaxed as possible.

4. Physical State. The rate of learning depends on physical state as well as the mental state. If a student is not feeling good before the lesson it is not a good idea to start the flight. In addition if the student becomes pale during the flight lesson it should be discontinued.

5. Motivation. Motivation is possibly the most important factor that influences the rate of learning in flight instruction. If a person is motivated he will learn much more quickly than if he is not motivated. The technique of instructing can help motivate the student. One way to help motivate the student is to keep him aware of the progress. If the student is not sure what the instructor is going to do during the next lesson he is not going to go into the project with enthusiasm. The student wants to know where the instructor is going and what the long term goals are. Positive reinforcement or praise helps motivate people to learn. Constructive criticism helps learning but must be presented properly to be sure it is taken as intended.

The United States Department of Transportation published the Aviation Instructor's Handbook (1977) which lists six obstacles to learning during flight instruction:

1. An unfair treatment feeling by the student.

2. Impatience during the more boring operations because the student is eager to proceed to more interesting and exciting operations.

3. Worrying about other issues, or a general lack of interest.

4. Sickness, fatigue or physical discomfort.

5. Apathy, fostered by poor instruction which is often due by poor instructor motivation.

6. Student anxiety.

Age And Learning

There have been several research studies done in the area of learning and how aging affects the learning process. Most researchers tend to agree that learning ability increases from birth to the late teens or early twenties and then levels off until late adulthood when it starts to decline (Knox, 1977; Thorndike, 1928; Cross, 1987).

Psychologists interested in adult learning have used intelligence tests to analyze the changing performance as people age. The traditional intelligence test is limited by time and scored by the number of correct responses in a specified time period. According to Cross (1987) the only limitation that increasing age has on learning ability is the time required to learn a particular task and aging need not be considered a major handicap in learning until quite late in life. If there is an age limit on learning performance, it is not likely to occur until around 75 years of age and this is largely due to deterioration of bodily functions (Kidd, 1973). Aging cells have adverse effects prior to age 75 but eyeglasses, hearing aids, increased illumination and increased time for learning can be used to offset this problem. Although a wide variety of physical changes come with increasing age, reaction time, vision and hearing are the three that are most likely to interfere with learning.

As people grow older their reaction time slows down. Speed of learning involves reaction time to perceive the stimulus, time to transmit the message to the brain and time to respond to the message and carry out the action. On the average older learners perceive, think, and act more slowly than younger learners (Cross,1987).

According to Cross (1987) who cites Horn, there are two different theories on aging and intelligence. The "bearish" believe that intelligence grows until early adulthood and then levels off until late in life when it deteriorates slowly The "bullish," who see intelligence as a product of learning, say intelligence should increase from infancy to old age. If tests do not reveal this, the tests must be invalid. The bullish say that true intelligence should improve with learning and experience and therefore age. Cross (1987, p. 159) goes on to say: "Most investigators, however, probably agree that practical intelligence that is, the ability to learn - is affected by both inheritance and the accumulation of experience and knowledge."

Motivation And Maturity

Motivation is perhaps one of the most important factors involved in flight training or any educational or training process for that matter. It is often said that a person can accomplish what ever they want to - if they want to bad enough and have the proper motivation. "When adults are motivated to learn, they work harder, learn more, have a sense of enjoyment and achievement, and want to continue learning" (Wlodkowski, 1986, p. 1).

According to the United States Department of Transportation (1977), motivation is usually the dominant factor that governs a student's ability to learn and the speed that is required to learn. Motivation comes in various forms: positive or negative; tangible or intangible; subtle or obvious. The best motivation for flight students should come in the form of positive reinforcement.

Healy (1985), administered the Career Maturity Inventory to 159 college students and the results suggested that career attitudes matured with age and directly affected months employed during college and grade point average and through the mediation of GPA, affected the occupational level of the students' jobs.

Theophilides, Terenzini, and Lorang (1984) made two observations regarding the freshman experience and how it relates to student motivation. One of the findings suggested that certain facets of the experience gained through the course of the freshman year are indeed related to the importance students attach (at the end of the freshman year) to the goals of obtaining a liberal education, gaining information useful for a career, and enhancing their interpersonal skills. The study also indicated that the change of attitude after the freshman year was independent of the students experiences before college or pre-college characteristics. The second observation was that the day to day contact of the students with the faculty had a positive influence on students' perceptions of the importance of obtaining a liberal education and gain information useful for a career.

Knowles (1980) introduced the theory of andragogy which means the education of adults as adults rather than as children. Knowles (1980) defines adults as people who are responsible for their own actions and who make their own decisions rather than defining adults as people who are a certain age or older. Adults are more motivated to learn if they view themselves as capable learners. This can be a problem if the adult learner has been away from the academic community for a while and has a feeling of incompetence toward learning new ideas. Adults will tend to be more motivated if they feel a sense of involvement and choice in how the learning activity will be conducted (Knowles, 1980). Knowles (1980) theory of andragogy suggests that adults are ready and motivated to learn when they feel the need to learn. The immediate application of the newly learned knowledge gives the adult learners a sense of accomplishment so it is beneficial to the learner and the instructor if the subject being taught can be related to day-to-day experiences and applications (Knowles, 1978).

Summary

Although the FAA sets a minimum number of flight training hours that an applicant must have before being recommended for the Private Pilot certification checkride, very few applicants have the competency and proficiency needed to pass the FAA checkride with only the minimum number of flight training hours.

There are several factors that influence the time required to complete the necessary flight training: intelligence, the instructor and the instructor techniques, physical state and anxiety, to name a few. Student motivation varies from student to student and can be influenced by the instructor.

The age of a flight training student is not considered to be a major factor that influences the flight training time period. It is commonly accepted, however, that as the age of adults increases - the time required to learn a new concept or task is increased. Older adults have a slower reaction time and given some increased time to deal with the new subject or task, older adults have no problem learning new material.

Motivation is quite possibly the biggest variable in the flight training time period. Motivation is generally increased in college age students as they progress through the four years of college.

CHAPTER III

PROCEDURES

Introduction

The purpose of this study was to collect data from Oklahoma State University Aviation and Space Education Private Pilot training records for the period of 1986-1988 on all students who completed a private pilot's certificate course to determine if age had a significant affect on the cost of completing flight training. The study was conducted with the basic assumption that all flying that was documented in the flight training log books was done solely for the purpose of improving the student's competency level needed to pass the checkride. In addition the researcher assumed that the student had the finances needed for the flight training as they became necessary and that the flight instruction was conducted according to an FAA approved flight training syllabus and by one primary flight instructor throughout the training program with the exception of the normally required stage checkrides with the chief flight instructor. Given these assumptions, this research project was conducted to determine if there is a significant relationship between age and the total number of flight training hours needed for the competency level required to pass the Federal Aviation Administration Private Pilot certification checkride.

The research consisted of determining the number of solo (practice) and dual (instruction) hours that each flight training student completed prior to the checkride and also determining the student's age.

Population

The population of this research project included only students meeting the following criteria:

1. Oklahoma State University Aviation and Space Education Department student.
2. Private Pilot student enrolled for flight training during the period of 1986-1988.
3. Student started with no previous flight training or experience.
4. Student passed the FAA checkride on the first attempt.
5. Flight training was completed in one semester.

Methodology

The data was collected by personally visiting each Oklahoma State University flight training contractor. All Private Pilot records were analyzed by hand and the flight training students' records which met the criteria mentioned were used in the study. The information that was collected from the records included age of the flight training student on the date flight training was started, hours of solo flight, hours of dual flight and total flight hours. Age was recorded in years and tenths while flight time was recorded in hours and tenths. The age groups were divided into two groups: (1) 18-21.9 and (2) 22 and over.

Analysis of Data

Based on the data collected, descriptive statistics including means, standard deviations and ranges for the two age groups were generated. In addition, Pearson Product - Moment correlations were generated between the following variables:

1. Solo hours, and student age.

2. Dual hours, and age.

3. Total hours (dual hours + solo hours), and age.

Finally, a one-way analysis of variance (ANOVA) using the factors of age and total hours flown was conducted.

CHAPTER IV

DATA PRESENTATION AND FINDINGS

Introduction

The purpose of this study was to collect data from Oklahoma State University Aviation and Space Education Private Pilot flight training records for the period of 1986-1988 and determine if age had a significant affect on the cost of completing Private Pilot flight training. The data were used to test the null hypotheses which stated that there is not a significant relationship between age and the total number of hours needed for the competency level required to pass the Federal Aviation Administration Private Pilot certification checkride.

Data

To determine if age has a significant affect on the costs associated with Oklahoma State University Private Pilot flight training, twenty eight students were identified that met the specified criteria. Each flight training student's data consisted of the following:

1. Case identification number.
2. Student's age group (18-21.9, and 22 and over).
3. Number of solo hours.
4. Number of dual hours.
5. Number of total hours.
6. Age, in years and tenths.

Data collected for each of the twenty eight students included in the population for the study is Appendix A.

Findings

Descriptive statistics were developed for all data collected. Table I displays this information for the population of the study. Table II shows the same data for those in the age range of 18-21.9 years. Table III has the data for the 22 years and older group.

Mean solo hours and total hours by age group are plotted as Figure 1. Similarly, mean total hours by age groups are displayed in Figure 2. Correlations using Pearson r were determined for age and hours flown including dual, solo and total. The values obtained in this analysis are displayed in Table IV together with square of the r value. All values indicate very low positive or negative correlation and hence a small amount of the variability is accounted for by the age factor.

Appendix B shows Pearson r values for all types of flight hours and age. The high correlation of dual hours with total hours (.97) was an unanticipated finding.

A one-way analysis of variance (ANOVA) was completed to compare the two age groups against the total number of hours flown. Table V represents the summary of the ANOVA. The F value (2.81) did not meet or exceed the critical value (4.22) for these data. Consequently the null hypothesis was retained.

TABLE I

DESCRIPTIVE STATISTICS FOR ALL STUDENTS

VARIABLE	MEAN	STD. DEV.	VARIANCE	Range
Solo hours	15.95	.968656	.938293	15.0-18.5
Dual hours	25.3464	2.8923	8.36542	20.0-33.2
Total hours	41.4107	3.42393	11.7233	35.1-49.7
Age	22.075	2.36938	5.61398	18.5-28.8

n = 28

TABLE II

DESCRIPTIVE STATISTICS FOR STUDENTS 18-21.9 YEARS

VARIABLE	MEAN	STD. DEV.	VARIANCE	Range
Solo hours	15.94	.992441	.98494	15.0-17.1
Dual hours	26.22	2.61003	6.81226	21.9-33.2
Total hours	42.4067	2.98954	8.93738	36.9-49.7
Age	20.5	.8143797	.6632143	18.5-21.8

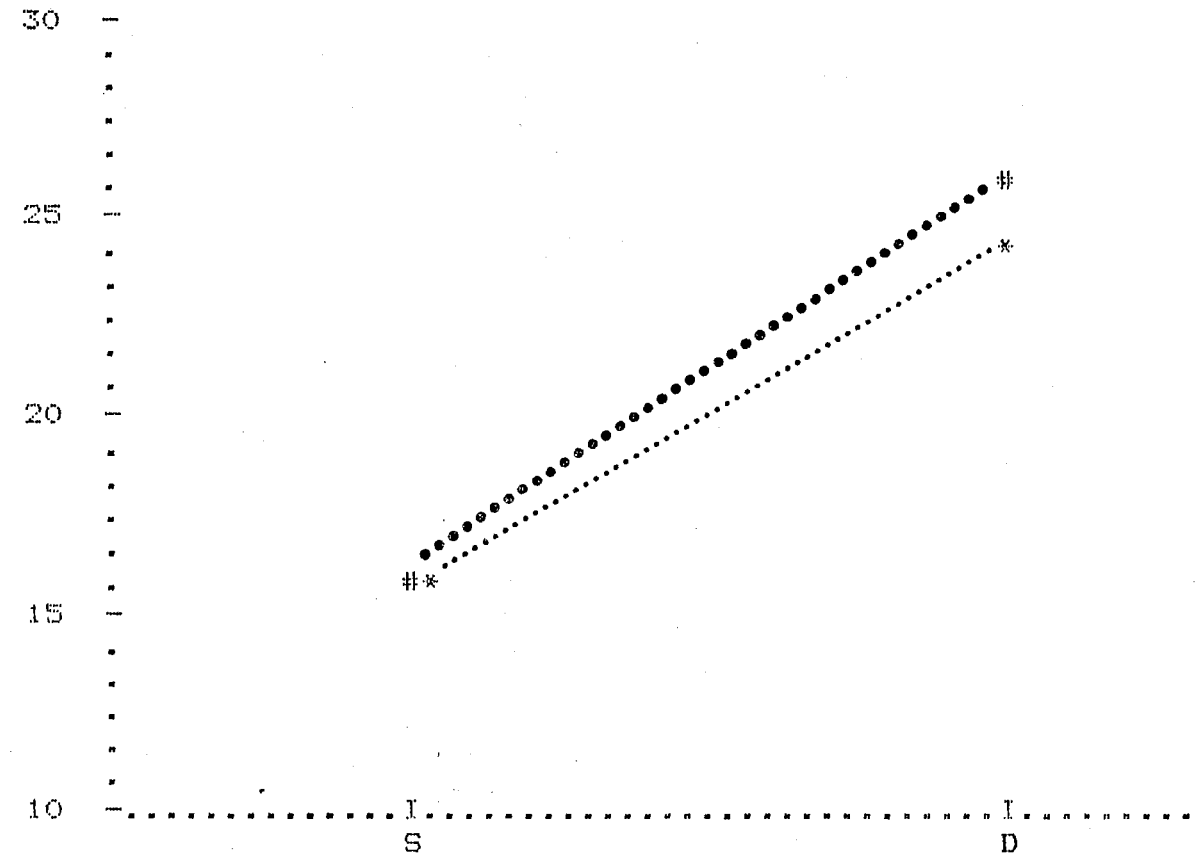
n = 15

TABLE III

DESCRIPTIVE STATISTICS FOR STUDENTS 22 YEARS AND OVER

VARIABLE	MEAN	STD. DEV.	VARIANCE	Range
Solo hours	15.9615	.94019	.883957	15.0-18.1
Dual hours	24.3385	2.8742	8.26105	20.0-29.7
Total hours	40.2615	3.53153	12.4717	35.1-47.0
Age	23.9	2.12222	4.50384	22.1-28.8

n = 13

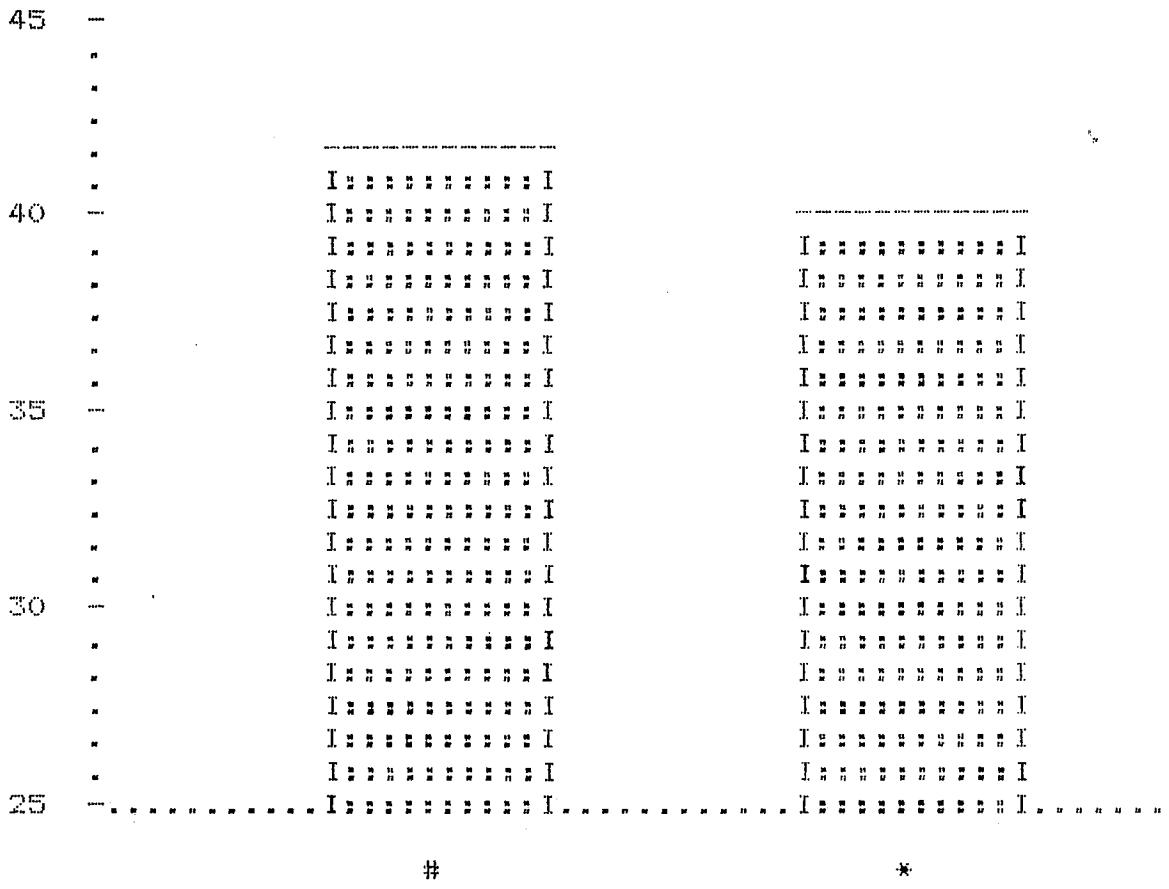


LINE GRAPH

MEAN HOURS FOR AGE GROUPS

KEY: S = SOLO HOURS
D = DUAL HOURS
# = 18-21.9 ••••
* = 22+ ·····

Figure 1. Mean Hours for Age Groups Line Graph



HISTOGRAM

MEAN TOTAL HOURS FOR AGE GROUPS

= 18-21.9
* = 22+

Figure 2. Mean Total Hours for Age Groups

TABLE IV

PEARSON-MOMENT CORRELATION (r) BETWEEN AGE AND SOLO, DUAL AND TOTAL HOURS FLOWN AND r^2

	r	r^2
SOLO HOURS WITH AGE	.17	.03
DUAL HOURS WITH AGE	-.15	.02
TOTAL HOURS WITH AGE	-.12	.01

n = 28

TABLE V

ANOVA SUMMARY COMPARING AGE GROUPS AND TOTAL HOURS FLOWN

SOURCE	S.S.	d.f.	M.S.	F
Between	32.0466	1	32.0466	2.81312 *
Within	296.188	26	11.3918	
Total	338.24	27		

F critical (1, 26) = 4.22

*p>.05, n = 28

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The Problem of the study was that the high cost of flight training is prohibiting many college students from choosing aviation as a major. The costs associated with flight training are prohibitive, not only to prospective pilots who would like to start a flying career, but also to current pilots who need recurrent training to upgrade to new equipment or to stay abreast of the changing technology.

The purpose of this study was to collect data from Oklahoma State University Aviation and Space Education Private Pilot flight training records for the period of 1986-1988 and determine if age had a significant affect on the cost of getting a Private Pilot's certificate. The null hypothesis tested in this study was that there is not a significant relationship between age and the total number of flight training hours needed for the competency level required to pass the Federal Aviation Administration Private Pilot certification checkride.

The data in this study was gathered from records of flight training students to determine how many flight training hours each flight training student had completed prior to passing the FAA Private Pilot certification checkride. These data as well as the age of each student in the population were analyzed statistically using both a Pearson r and the ANOVA to determine whether or not a relationship existed between the variables of interest. The correlation between age and total hours flown prior to successfully

completing the checkride for the private pilot's certificate was very low. The ANOVA comparing the two age groups on the total hours resulted in an F value below the critical value. Consequently the null hypothesis was retained.

Discussion of Findings

The literature on adult learning supports the belief that the ages of the flight training students alone would not influence the student's ability to learn new information or skills. While the study revealed that the older group had a mean total number of hours flown that was less than the mean total hours flown for the younger group, this difference was not statistically significant. On the other hand, the life cycle theory suggests that the older a student gets, the stronger the motivation in student selected learning activities. At the same time, motivation has been shown to be the dominant factor in a student's learning to fly. However the lack of significance in total hours to pass the checkride would indicate this factor to not have been of a differing influence on the two age groups for this study..

The high correlation between dual hours flown and total hours flown revealed in the Pearson Product-Moment correlation matrix, suggests that the number of dual hours flown is more important than age and solo hours flown, when determining total hours flown.

Conclusions

As a result of this study, the following conclusions were drawn:

1. Age of aviation students in the AVSED pilot training program is not a factor in determining total hours required to pass the Federal Aviation Administration Private Pilot certification checkride.

2. Dual hours of instruction is more important in determining total hours of flight instruction than is age.

Recommendations

As a result of this study the following recommendations were made:

1. Research based on reduced hours of dual instruction and a corresponding reduction in total hours required prior to the Private Pilot FAA checkride should be proposed to the FAA.

2. Further research should be conducted regarding motivation and as a factor related to the amount of flight training required before passing the FAA checkride.

3. Further research should be conducted to determine if different flight instructor's techniques affect the number of flight training hours needed before the checkride.

LIST OF REFERENCES

Brown, David, A. "RAF Revamps Courses to Increase Number of Graduates, Trim Costs" Aviation Week & Space Technology, Vol. 128 (June 13, 1988) p. 90-93.

Bougue, Ninita, E. Developing a Resource Unit in Aerobatics. (Unpub. Ed.D. Dissertation, State University of New York at Buffalo, 1985.)

Collins, Richard, L. "Why Flight Instructors Can't Teach" Flying (April,1984), pp. 77-79.

Cross, Patricia, K. Adults As Learners. San Francisco, CA: Jossey-Bass, 1987.

Federal Aviation Administration. Federal Aviation Regulations. Washington, DC: FAA 1989.

Healy, Charles, C. "Relation of Career Attitudes to Age and Career Progress During College." Journal of Counseling Psychology, Vol. 32, No. 2 (April,1985), pp. 239-244.

Holden, Jolly Taylor. The Relationship of Cognitive Style to Proficiency in a Flight Training Program. (Unpub. Ed.D. Dissertation, University of Southern California, 1984.)

Kershner, William, K., The Flight Instructor's Manual. Ames, IA: Iowa State University Press, 1985.

Kidd, J.R. How Adults Learn. New York, NY: New York Association Press, 1973.

Knowles, M.S. The Adult learner: A Neglected Species (2nd ed.), Houston, TX: Gulf, 1978.

Knowles, M.S. The Modern Practice of Adult Education: From Pedagogy to Andragogy. Chicago, IL: Follett, 1980.

Knox, Alan, B. Adult Development and Learning: A Handbook on Individual Growth and Competence in the Adult Years for Education and the Helping Professions. San Francisco, CA: Jossey-Bass, 1977.

Olcott, John, W. "Cause and Circumstance: Engine Out Training." Business and Commercial Aviation (Sept. 1987), p. 180.

Oklahoma Aeronautics Commission. Aeronautical Chart of Oklahoma. Oklahoma City, OK: OAC, 1987.

Parke, Robert, B."The Pilot Shortage: Who's Hurting-and Who is Helping?" Business & Commercial Aviation (Oct., 1988), pp. 130-135.

Roscoe, Stanley, N. Aviation Psychology. Ames, IA: The Iowa State University Press, 1980.

Smith, Bruce, A. The Optimum Presentation of Cognitive Training During A Flight Training Program. (Unpub. Ph.D. Dissertation, Florida State University, 1984.)

Theophilides, Christos. Terenzini, Patrick, T. and Lorang, Wendell. "Relation Between Freshman-Year Experience and Perceived Importance of Four Major Educational Goals." Research in Higher Education, Vol. 20, No. 2 (1984), p.235.

Thorndike, Edward, L., Adult Learning. New York, N.Y: Macmillan, 1928.

United States Department of Transportation. Aviation Instructor's Handbook, AC 60-14, Washington, DC: US DOT, 1987.

United States Department of Transportation. National Airspace System Plan, April, Washington, DC: US DOT, 1987.

Wlodkowski, Raymond, J. Enhancing Adult Motivation To Learn, San Francisco, CA: Jossey-Bass, 1986.

APPENDIXES

APPENDIX A

DATA USED IN RESEARCH

TABLE VI

DATA USED IN RESEARCH

Case #	Age	Solo Hours	Dual Hours	Total Hours
1	23.3	16.4	29.7	46.1
2	20.5	18.5	27.3	45.8
3	23.6	18.1	28.9	47.0
4	21.4	16.4	27.1	43.5
5	24.4	16.6	24.2	40.8
6	22.2	15.1	23.3	38.4
7	21.4	16.0	27.7	43.7
8	22.5	15.1	20.0	35.1
9	20.6	15.0	21.9	36.9
10	28.5	16.4	24.6	41.0
11	20.2	16.0	27.1	43.1
12	23.4	16.3	21.4	37.7
13	18.5	17.3	23.8	41.1
14	18.5	15.0	26.7	41.7
15	22.1	16.1	24.5	40.2
16	19.5	16.1	33.2	49.7
17	20.8	15.4	25.7	41.1
18	18.9	15.1	25.2	40.3

TABLE VI (Continued)

Case #	Age	Solo Hours	Dual Hours	Total Hours
19	22.8	15.0	24.6	39.5
20	21.8	15.8	29.1	44.9
21	28.8	17.1	26.5	43.6
22	20.6	17.1	24.7	41.8
23	21.4	15.1	26.2	41.3
24	21.8	15.3	24.1	39.4
25	23.0	15.0	26.1	41.1
26	21.5	15.0	23.5	39.5
27	23.3	15.0	20.1	35.1
28	22.5	15.3	22.5	37.8

APPENDIX B

CORRELATION MATRIX-PEARSON PRODUCT-MOMENT, BIVARIATE CORRELATION

TABLE VII

CORRELATION MATRIX-PEARSON PRODUCT-MOMENT, BIVARIATE CORRELATIONS

	SOLO HOURS	DUAL HOURS	TOTAL HOURS	AGE
ROW 1				
SOLO	1	.369242	.562135	.170345
ROW 2				
DUAL HOURS	.369245	1	.9666	-.145325
ROW 3				
TOTAL HOURS	.562135	.9666	1	-.118172
ROW 4				
AGE	.170345	-.145325	-.118172	1

VITA

Paul Allen Burrell

Candidate for the Degree of

Master of Science

Thesis: A COMPARISON OF PRIVATE PILOT FLIGHT TRAINING HOURS FOR TWO AGE GROUPS

MAJOR FIELD: Occupational and Adult Education

Biographical:

Personal Data: Born in Fairview, Oklahoma, July 28, 1964, the son of Bryan L. and Sue Burrell.

Education: Graduated from Fairview High School, Fairview, Oklahoma, in May 1982; received Bachelor of Science degree in Agricultural Economics from Oklahoma State University at Stillwater in May, 1987; completed requirements for the Master of Science degree at Oklahoma State University in May, 1989.

Professional Experience: Family owned and operated John Deere farm machinery dealership,1972-1986; Farmer/Rancher, 1972-1987; Flight instructor/charter pilot, 1986-1987; Pilot, Flight Transportation Department, Oklahoma State University, 1986-1989; Chief Instructor, Department of Aviation and Space Education, Oklahoma State University, 1987-1989