

Development of Aviation Management Coursework

Gerald R. Fairbairn

San Jose State University

Daniel Webster College

Running Head: DEVELOPMENT OF AVIATION MANAGEMENT COURSEWORK

## Abstract

Students graduating from aviation programs frequently move into careers that have a significant management component. As a result aviation management courses have evolved in aviation curricula to prepare graduates for these positions. However, many of these courses fall far short of their potential because relatively few aviation faculty are prepared to teach in this area, there is little interaction between these faculty, and the size of the market does not warrant publication of textbooks with adequate depth. The objective of aviation management courses should be to provide enough depth in the unique aspects of a particular field of aviation to enable the student to engage in critical analysis and problem solving in that field. In addition, the courses should be structured in a manner that allows students to integrate material and apply management skills. What is needed is a broad based organized effort to identify appropriate content for aviation management courses, and to develop activities which will meet the objectives of these courses. This paper presents a potential program to meet the first need, and two examples which illustrate the type of activities that can be used to meet the second need.

## Development of Aviation Management Coursework

Most Aviation programs include course offerings in the area of Aviation Management such as Air Transportation, General Aviation Management, or Airport Management. Some programs even offer a degree with titles similar to Aviation Management.

These courses and programs have evolved from a number of sources. Some of the programs were designed from their outset to prepare students to enter various management positions, but other programs consist of courses which were implemented in aviation programs that concentrated primarily on the technical aspects of the aviation industry such as flight training or maintenance training. This latter approach was quite natural since many of the graduates of these programs were employed in management positions or moved into jobs with a significant management component.

But what is unique about a managing an airport, an airline, or a general aviation operation? Why not just prepare a person to be a manager. Why should special training be required to be a manager in the aviation industry? People come out of business schools and move into management in many industries without special training in that particular industry. Why should aviation be any different. And if special training is required, what

specific material should be taught? This question has been addressed by aviation departments as they developed curricula, by the professors assigned to teach aviation management courses, and by others interested in this area. The question has been answered many ways, however, for a number of reasons the resulting courses have varied widely in subject matter, depth, and quality.

Based on personal experiences teaching in this area, discussions with other professors and department chairpersons, examination of course outlines, and reviews of textbooks, I believe there is a need to clarify the objectives of aviation management courses and provide a foundation for their development. It is necessary to define the function of the courses in the overall curriculum, and identify their appropriate content and structure.

Many of the courses currently taught tend to be heavily descriptive, and cover such a broad range of topics that they often lack depth in any one area. In addition, they lack the structure that would provide students with the opportunity to practice their management skills. There are a number of reasons aviation management courses haven't developed to their fullest potential. First, many professors assigned to teach the aviation management courses have a teaching background that is not well suited to these types of courses. Most technical aviation

teaching fits into the category which Dressel (1980) referred to as discipline-centered teaching. In discipline-centered teaching the "Course is based solely upon the concepts, principles, theories, and methods characteristic of the discipline" (Dressel, 1980, p. 126). He suggests that these types of courses typically are taught using lectures and standard texts with an emphasis on systematic coverage of a body of knowledge. This is quite different from the more student-oriented teaching that may be required to convey management concepts effectively. Generally this approach requires a method of instruction that "..emphasizes student involvement and interaction as a means of personal and social development." (Dressel, 1980, p. 126).

Second, there is a lack of communication among people working in this field. There are relatively few people involved in teaching aviation management, most of these are geographically separated, and there is not a strong centralized effort to develop and give direction to the field. Because of this the experience individual professors gain in this area is rarely disseminated to others. As a result instead of advancing the field, the practitioners are continually rediscovering the answers to questions that others already addressed but did not disseminate.

A third reason for lack of full development of aviation

management courses is that textbooks, which often stabilize and provide direction for a field of study such as this, are not adequate. Although there are several good texts that cover specific aspects of aviation management, most are written to try to fit a broad range of classes (which is necessary due to the small size of the overall market). As a result the same aviation management text may be found in exploratory courses in community colleges, and also in capstone courses offered in the university degree programs. These texts are usually written for the lower level classes and consequently have deficiencies for the upper level classes that must be overcome by additional material prepared by the professor.

In summary, the problem with Aviation Management is that it does not have a clearly defined curricular content or structure. This is due to many faculty members lack of background to shift easily into this area; to the lack of interaction between people teaching in this area; and to the inadequacy of published materials for the diverse needs of courses in this area.

The purpose of this paper is to promote an improvement in the quality of aviation management courses. This will be done by identifying the course structure and the types of materials appropriate for inclusion in these courses, and by recommending a manner for professors in the field of aviation management to interchange ideas and to build a

foundation of materials that can be used to tailor aviation management courses to the needs of the institution offering the program. This paper will attempt to define not the specific subject material that would go into an aviation management course, but rather the type of material, problems, exercises, and projects that are appropriate.

### Course Content and Structure

#### Introduction

There have been hundreds of definitions or descriptions of a manager's job, but for the purposes of this paper it is important to note that managers integrate a body of knowledge for the purposes of planning, execution, and control of some activity. The manager's role is an active one. It is not just understanding a body of knowledge or being able to recall specific facts, but also the application of his knowledge. A manager must understand a body of knowledge to perform the job of management just as a pilot must understand a body of knowledge in order to operate an airplane. But the job of managing is the active application of this knowledge just as the job of a pilot is the active application of his knowledge. Consequently the management coursework should provide both the body of knowledge required by a manager in the aviation industry, and also provide the structure that allows students to

actively practice the management functions. This is not to say that each course must contain both the teaching of new material and practice of the management functions. It may be that within a curriculum several courses teach just the facts, principles, modes of inquiry, and skills that are needed by a manager in the aviation industry, while other courses are built almost entirely around the integration and application of this knowledge.

Almost by definition, skill and distribution requirements should come early in the student's career, and the integrative courses should either be distributed throughout or concentrated at the end. (The Carnegie Foundation for the Advancement of Teaching, 1977, p. 14).

#### Transmission of Knowledge

To think critically, to be able to develop creative solutions, to understand how a specific decision affects the whole, etc. it is necessary to have depth of knowledge of the subject. For instance, a person put in charge of the flight training department obviously must be knowledgeable in the field of flight instruction, but in order to operate effectively he or she should also be competent in numerous other areas. It is necessary to understand the cost of operating airplanes, and how different operating practices are likely to affect these costs. It is necessary to understand the aviation industry



safety standards and the philosophy behind the development of these standards; it is necessary to understand the relationship that typically exist between the airport and its operators; it is necessary to be aware of the potential legal liabilities, and how to manage the risk associated with this liability by balancing insurance and other programs. The list could be extended much further.

It has often been said that the reason many aviation businesses are not successful is that they are run by pilots or mechanics rather than businessmen. But there are also many examples of failures of aviation operations run by men who were very successful in other forms of business, but lacked adequate knowledge of the field of aviation. For instance there are a number of instances of successful automobile dealers who were unable to effectively operate an airplane dealership. In addition many people who are successful in one aspect of the GA business have trouble when they try to expand into others. This is not from lack of knowledge of business, but lack of knowledge of the particular aviation business. Many industries can hire new employees directly out of business schools and train them to be managers in business operations such as retail stores, insurance, manufacturing operations, etc. However, putting a business school graduate directly into a GA operation would not usually be considered a feasible approach because there is so much

specialized knowledge that is required to perform adequately.

McPeck (1981) makes the point that it is impossible to engage in activities such as critical thinking without a thorough knowledge of the subject area. He continually stresses the point that thinking, critical thinking, problem solving, and other forms of analysis cannot exist in the absence of a subject area. The following statement made in an analysis of the contribution made by the field of logic is typical.

However, there is one significant point for which the positivists must be given due credit, and that is that logic, as such, is used for the assessment and justification of arguments and theories once they have been presented. But it cannot generate (or formulate) hypotheses, theories or arguments in a problem-solving situation. Having the tools of logic available to help us do this checking is valuable indeed; but they are virtually useless in helping us to find our way out of problematic situations the solutions to which depend on possibilities and hypotheses. Logic can help to eliminate hypotheses, conjectures and plausible solutions, but it cannot provide them. In the most common problem-solving situations within disciplines and working fields of knowledge, the most difficult - and perhaps most important - phase is that of producing a

hypothesis, conjecture or alternative that is worth checking or trying out (McPeck, 1981, p. 15).

This same concept can be extended to managing any type of operation where the characteristics of the industry play an important part in the decision making process. It is often not the assessment of various alternatives that is most important, but the development of those alternatives. Arguments that a good manager can manage any type of business (and that experience in a particular industry is not necessary) typically cite instances in which successful people have moved from one industry to another. The fact that is overlooked is that these managers typically depend heavily on the knowledge and advice of managers at lower levels in the organization.

The point being made here is that whatever subject matter is included, it needs to be covered in adequate depth to give the student the material needed to engage in critical thinking, problem solving, and other skills. McPeck (1981) stresses that this should include the foundations of various types of beliefs or the epistemology of the field. "In short, the epistemology of various fields, more than anything else, provides one with the requisite knowledge to employ his critical acumen effectively." (p. 156).

It must also be kept in mind that as students move into management positions they will continue to acquire

knowledge of their specific field, and it is probably most important that they learn from their formal education the types of material that are important to exercising their analytical skills. "It [a formal education] acquaints them with ways of learning and makes it possible for them to educate themselves." (The Carnegie Foundation for the Advancement of Teaching, 1977, p. 152).

#### Integration of Material

Insuring that aviation management courses have the proper content is one part of the problem, but equally important is the structure of the classes. Exercises, projects, and other activities need to be developed that require students to apply the basic concepts learned in English, computer science, business, aviation, and human relations classes. These activities should not involve recital of facts but the application of ideas and concepts to problems. These projects should involve such things as finding the right airplane for a particular job, making a forecast of where an industry will be in five years, selecting the best of two airlines to work for and then justifying the decision, etc. The key here is in using the skills.

An analogy about learning to fly may help to make this point a little clearer. In a college program that is designed to prepare professional pilots the students are taught skills at a number of different levels. They are

provided with descriptive material regarding the nomenclature and structure of an airplane, some descriptive aerodynamic theory, and they are told about how to fly an airplane and to make it perform in a given manner. They are then required to apply this basic learning so that they develop the motor skills necessary to actually fly a training airplane. While they are involved in this process they also learn judgement and decision making skills. Once they have completed their training and have a commercial certificate they are still relatively inexperienced and can only handle the simplest of commercial flying tasks, but they have proven they are capable of learning the motor skills and the decision making processes necessary to advance. And they have a broad foundation on which to build.

At the present time we are offering most aviation management students only the descriptive part of their management preparation. If aviation students are to go into the aviation job market with an advantage over other majors they need to be provided with more than just descriptive training. In addition, the student has not found out if the work of aviation management suits him or her (pilot candidates frequently find that they do not want to pursue a flying career); nor has the student been given the opportunities to develop the actual skills that will be used; nor has the student proven that he or she is capable

of learning and applying these skills.

The aviation management courses must be designed to build managers and develop their capabilities, and also to provide a way to judge a student's performance as a manager. Programs must be developed to allow direct observation of a student's abilities in a managerial role. This is difficult since most of the traditional class structures do not provide the situations needed to accomplish this. However many professors have done work in this area and there are activities which will meet these objectives. In the following section two examples are presented that have been used in this manner and found to be quite successful.

#### Examples

Following are two examples of activities that incorporate the ideas presented above. They involve the transmission of basic knowledge to the students, require that the students integrate basic business concepts and skills with the aviation material, and these provide an opportunity for students to apply management skills. Both of these activities are computer based simulations of business situations which are major units used within two aviation management courses. Even though these are both computer simulations it is not intended to imply that these are the only types of activities that will produce the desired results.

The Aircraft Sales Simulation

Description. This simulation is normally used in a class that studies the general aviation industry. It is a simulation of companies that buy used airplanes on the wholesale market and sell them on the retail market. Typically three to five companies are involved in the simulation with two to four students running each company.

The companies are provided with a list of forty airplanes describing each in adequate detail to allow the determination of its retail price based on an aircraft "blue book" or "price digest". Based on this information, and data on their company's fixed and variable cost of operation, students bid for airplanes they would like to buy for their inventory, and indicate the sales price they would set for the airplane.

All of the bids are stored in computer files until the master program is run by the instructor. This program collects the bid information and allocates the airplanes to the company that is the highest bidder with enough of their allocated quarter million dollars of flooring left to purchase the airplane. Once the airplanes are allocated through this auction process, the computer determines the expenses the company would incur based on the standard fixed costs, and variable costs based on the inventory level. The simulation next generates buyers for the

airplanes and determines which airplanes would sell. If a company has set the sales price for an average airplane at its nominal value then it will have about a fifty percent chance of selling. Airplanes that are priced higher than they should be have less of a chance of selling, and those priced lower than nominal have a better than average chance of selling. The chances of an airplane selling is also affected by the company's reputation that is determined by whether it has a reputation for pricing airplanes high or low.

The results of the simulation are printed out with each company receiving an income statement for their company, and an activity report that shows which airplanes were bought and sold that month, and which are available for purchase at the next auction.

Basic Material. In the process of participating in this simulation the students learn a great deal about general aviation airplanes. For instance, during the evaluation of these airplanes and through class discussion they are exposed to the base prices; the standard equipment levels; the value of additional equipment such as avionics; the cost of engine overhauls; the impact that major damage history has on the airplanes value; and other factors that affect the value of the airplane.

Basic Concepts. In determining operating strategies the students must deal with basic business concepts such as the



tradeoff between markup and sales volume (low price / high volume vs. high price / low volume); they must deal with probability concepts since in any given month the sales volume is partially determined by chance; they must develop adequate record keeping systems to track trends in their own business and in the market; and they must devise a method of identifying the airplanes with the greatest profit potential.

Management Skills. Due to the number of airplanes and the possibility of making a mistake in evaluation it is necessary to carefully manage the company's resources. The students must develop a system that provides adequate time to plan company strategy, insures that data is entered in a timely manner, and provides for adequate control to insure one student does not make mistakes that will cause significant losses for the company (which impacts the grades for all the students in that company).

#### The Airline Simulation

Description. This simulation is used in an air transportation class and involves three airlines that are competing over a four city network. Each airline is typically run by three to five students who try to make changes to improve the profitability of their airline. The students are given information about aircraft operating expenses including the lease costs, operating costs, and passenger capacities of available airliners. They are also

given information on the demand for each city pair including the number of passengers, the approximate desired travel time demand distribution, and the dominate type of travel (business, tourist, etc.).

The simulation is normally run one quarter (three months) per round. That is, the students start with the income statements and traffic statistics with the initial operating conditions. They then decide on the changes that should be made to obtain a competitive advantage, and implement those changes. The simulation is then run and they are provided the results of three months operation under those conditions.

The students can change the departure times of flights, add or delete flights or connecting schedules, change the type of airplane used, change advertising and service levels for individual routes, and change the fares on individual routes. Since having all of these factors variable from the beginning would be overwhelming, the simulation is typically started with only one factor being variable at a time, and then working into multiple variables.

Basic Material. In the process of participating in this simulation the students learn a great deal about the airline industry. In order to operate effectively they must understand the terminology used on income and traffic statements, the relative expenditures in various parts of

the airlines operation, typical operating costs, how these costs are affected by variations in the level of expenditures, and factors that have an effect on demand for particular airlines services. In addition, due to the number and complexity of potential alternative courses of action, it is necessary for each company to develop an electronic worksheet (such as Lotus 1-2-3) in order to evaluate these alternatives.

Basic Concepts. In determining operating strategies the students deal with basic business concepts such as market share, market penetration, and price elasticity. They learn the importance of taking competitive response into account in their decision process, and they pick up an appreciation for the tremendous complexity of an airline operation. Setting up a schedule for as few as four cities with four to six airplanes is extremely challenging, and the results generally demonstrate the rewards of diligence.

Management Skills. Because of the complexity of the operation and the volume of data that must be analyzed at the end of each round it is important that each group be run effectively. It is absolutely essential to establish standardized procedures which insure that each person does a proper job of analysis, and reports it in a manner that enables intelligent decisions to be made regarding needed changes. This simulation gives the instructor an excellent opportunity to evaluate the students analytical abilities,

their ability to integrate previously learned material, and their ability to function as a leader and as a team member.

#### Conclusion and Recommendations

This paper has attempted to provide a focus on the types of material and the structure that is appropriate for aviation management classes. These concepts need to be discussed, refined, and narrowed to the point that they provide guidelines for the development of aviation management courses. In addition, work needs to be done on identifying and assembling the facts, principles, skills, and modes of analysis that should make up the content of the courses. This should be an ongoing process and result in both informal exchanges and the publishing of papers.

Along with work on the appropriate content for these courses, efforts must be made to develop and disseminate a wide variety of projects, games, simulations, and other activities that will provide a stimulating learning environment, and will provide the opportunity to apply knowledge accumulated from previous experiences. This approach is already being used in other disciplines where there is a need for new and innovative projects that can be used in the educational process.

The American Association of Physics Teachers has conducted a survey of introductory physics courses for use in preparing instructional modules (independent units of instruction with clearly defined objectives),

and both the American Institute of Biological sciences and the American Geological Institute have sponsored development of teaching materials and special reports related to undergraduate education (The Carnegie Foundation for the Advancement of Teaching, 1977, P. 42).

Individuals have already accomplished a great deal in this area, but it is inefficient for individual faculty members to try to meet these objectives on their own. A centralized effort is needed to focus attention on this area and to provide both informal and formal opportunities for the exchange of ideas and materials. The need for work to clarify and integrate structure, content, and objectives is stressed by Dressel (1980). This idea is summarized in the statement:

No course and no program of courses can attain optimal impact until the interrelationships of the structure including experiences, content, and materials with the activities and interactions of students and teachers have been clarified and exploited in reference to the achievement of program objectives and the social outcomes upon which these are based. For most individuals, content becomes meaningful only as it is presented through meaningful and relevant structures. (p. 25).

Because of the relatively small number of courses

offered in aviation management, and the geographical dispersion of faculty members, it is important that an organized effort be made to implement the processes mentioned above. An independent organization set up for these purposes is not viable due to the limited number of potential participants, which makes an existing organization the most likely possibility.

The University Aviation Association (UAA) seems to be the most logical choice to organize efforts aimed in this direction. Most of the institutions involved in aviation management are represented in the UAA, and it has communication channels in place to tie together the interested parties. It publishes papers which can be used for the development and dissemination of work in this area, and it could provide the central exchange needed to disseminate course materials that are developed.

The result of an effort in this area will be an improvement in the quality of the aviation students, and in upgrading of the reputation and status of aviation programs.

References

- Astin, A. W. (1985). Achieving Educational Excellence. San Francisco: Jossey-Bass Publishers.
- Cole, C. C. (1982). Improving Instruction: Issues and Alternatives for Higher Education. Washington, D.C.: American Association for Higher Education.
- Dressel, P. L. (1980). Improving Degree Programs. San Francisco: Jossey-Bass Publishers.
- McGrath, E. J. (1974, October). Careers, Values and General Education. Liberal Education, 280-291.
- McPeck, J. E. (1981). Critical Thinking and Education. New York: St Martin's Press.
- Quehl, G. H. (Ed.). (1977). Developing the College Curriculum. Washington, D.C.: Council for the Advancement of Small Colleges.
- The Carnegie Foundation for the Advancement of Teaching. (1977). Missions of the College Curriculum. San Francisco: Jossey-Bass Publishers.