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ETHICS EDUCATION IN UNIVERSITY AVIATION MANAGEMENT PROGRAMS IN THE US: PART TWO B—STATISTICAL ANALYSIS OF CURRENT PRACTICE

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ABSTRACT

This three-part study examines how four-year universities in the U.S. with baccalaureate programs in aviation management include ethics instruction in their curricula. Part One justified the need for ethics education and developed hypotheses to evaluate the current status of ethics instruction. Part Two of the study continued with a quantitative analysis of an extensive survey of all collegiate aviation management department heads. Survey data reported in Part Two A revealed that ethics is not widely included in collegiate aviation programs at levels expected in light of current industry problems. Part Two B of the study, which follows, shows that as predicted, strong department head support for ethics instruction and active department head involvement in teaching ethics led to higher levels of planned ethics inclusion. Faculty interest was a second influential characteristic.

INTRODUCTION

Enron, MCI Worldcom, Tyco, Xerox, RiteAid, Arthur Andersen, ImPlone, Global Crossing, and Adelphia are all corporate names now synonymous with fraudulent business activities, illegal accounting procedures, unethical senior management personnel, unknowing employees who lost all their retirement accounts, and other devastating revelations. Unethical activities also exist in the aviation world as already

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documented in this series of articles. Although they have not had the media coverage nor the economic impact of the corporate list above, they still represent problems which result in improper business practices, unjust financial gain, and safety and security issues that have resulted in loss of life.

This series explores ethics instruction in aviation management programs at U.S. four-year colleges and universities as part of the answer to stem the tide of ethical problems. Part One (Oderman, 2002) presented justification for such instruction and developed hypotheses to study the subject. Part Two reports (in two articles) on a quantitative analysis of current ethics instruction programs in collegiate aviation management curricula. Part Two A (Oderman, 200X) described a survey developed and conducted by the author to gather data from department heads of all such programs in the country. The author described present practices and reached the conclusion that not much is being done currently. In Part Two B that follows, the author statistically analyzes the survey data to look for trends and factors that influence the inclusion of ethics in aviation curricula. Part Three (yet to come) will describe the results of a qualitative study of this subject and make recommendations for future practice.

RESEARCH DESIGN AND METHODOLOGY

The survey used in Part Two, along with a definition of variables and a concept called the Ethics Inclusion Scale (EIS), were thoroughly described in the previous article in this series (Oderman, 200X). Readers should refer to Part Two A to understand all terminology. In this article the author will only elaborate on the statistical procedures used to analyze the survey data.

The author analyzed responses to all objective-style survey questions. He also categorized responses to two open-ended questions and described these results statistically. Three statistical tests were used. For quantitative variables, the author used a 2-sample t-test or a 1-way ANOVA. When categorical variables were involved, the chi-square test was used.

To perform the analysis, a p-value of less than <.10 was selected beforehand as an indication of significance. Gall, Borg, and Gall (1996) define statistical power as "the probability that a particular test of statistical significance will lead to rejection of a false null hypothesis" (p. 187). They go on to say:

> Statistical power can be increased by lowering the level of significance needed to reject the null hypothesis. Thus, a test of statistical significance with a *p* set at .10 is more powerful than the same test with *p* set at .05. ("More powerful" means that it is easier to reject a false null hypothesis.) In practice, *p* usually is set at .05. However, as we explained above, some researchers feel that it is permissible to set *p* at .10 in exploratory studies in order to increase statistical

> power. A *p* of .10 increases the risk of a Type I error, but it might spotlight a potentially important difference, relationship, or effect that would have been overlooked had a lower *p* value been set. (p. 187)

Because this study of ethics and aviation management programs is the first one of its kind to be done, using a p <.10 may spotlight important relationships. In any case, the author reports the actual computer-calculated p-value for all tests performed in this study. In view of the usual convention of setting the p-value at .05 or lower in quantitative studies, the reader may choose to use more caution in this study with results in which a p-value between .05 and .10 is determined.

The survey instrument was designed to investigate a series of hypotheses regarding the inclusion of ethics in aviation curricula. These hypotheses were fully explained in Part One of this series (Oderman, 2002) in the form of eight lessons learned from other academic curricular areas (law, medicine, business administration) and seven lessons learned about educational change from Fullan and Stiegelbauer (1991). Two general approaches were used to test the hypotheses.

First, the EIS level was used as one variable in statistical tests to determine if there is a relationship between ethics inclusion and other variables hypothesized as factors associated with initiation or adoption of effective ethics instruction. Results from these tests are listed on Table 1. Data shown includes the test used, test statistic value, and p-value for each test. Comparisons that produced statistically significant results at the p <.10 level are marked with an asterisk (*). Several of the planned statistical comparisons are marked to indicate an adequate test could not be performed due to lack of variation in survey responses. All or nearly all responding department heads gave the same answer to questions related to certain variables.

The second approach was a set of tests for each hypothesis using the five specific methods for teaching ethics in aviation management curricula (instead of EIS) as one of the variables for comparison. Results of these tests are listed on Table 2. The test statistic value and p-value of each test are also included. Some cells are annotated to indicate an adequate test could not be performed for the same reason cited above. Statistically significant tests (p <.10) are marked with an asterisk (*).

An important caution needs to be made. This study was not an experimental study in which an independent variable was manipulated and corresponding dependent variables were monitored for change. Since this study was strictly descriptive, labeling variables as dependent and independent is really arbitrary. Certain relationships between variables were suggested by the literature review, but a descriptive study cannot establish direction from one variable to another, and the statistical tests

certainly do not infer cause-and-effect relationships. Therefore, although the statistical tests performed may show relationships or associations between the variables studied, they do not show cause-and-effect. For uniformity, statements describing significant results in the statistical tests performed will be stated in the direction suggested by the findings in Part One (Oderman, 2002).

RESULTS

Response data to the survey questions was tabulated in Part Two A (Oderman, 200X) of this series. That data will be mentioned throughout this part, and readers can refer to it if necessary.

A Comparison with Lessons from Other Academic Areas

In Part One (Oderman, 2002), the author summarized eight lessons learned from other academic areas that have begun efforts to establish ethics as an essential part of their curricula.

Lesson one — the need for ethics instruction

The hypothesis from lesson one was that educators from the aviation community believe that ethics should be part of college aviation administration curricula, and few would voice the opposite opinion. Survey response statistics clearly support this. For instance, 39 of 40 (98%) of department heads *agree* or *strongly agree* that ethics should be taught in all applicable aviation courses. Only 23 of 41 (56%) *agree* or *strongly agree* that ethics should be a required course in every student's program. When asked if they had already supported decisions to include ethics as a required course, an elective course, or in other aviation courses as a planned topic, 14, 17, and 21 department heads, respectively, responded in the affirmative. More significantly, no department heads reported that they had ever opposed a decision to include ethics in any way from the curricula at their institutions.

Table 1 lists results of statistical tests that compare level of planned ethics inclusion (the EIS level) with the following variables from lesson one: administrative approval, administrative disapproval, and administrative involvement. Similar test results comparing ethics instruction delivery methods with the same variables appear in Table 2.

In spite of highly favorable opinions about the need for ethics instruction, it is noteworthy that the strength of positive opinion about including ethics is not matched with the actual inclusion of ethics in the curricula. Nevertheless, statistically ignificant tests affirm the validity of the lesson one hypothesis. In terms of the construct, administrative

Table 1. Level of Planned Ethics Inclusion in Relation to the Lessons, Factors and Other Variables Associated with Initiation or Adoption of Effective Ethics Instruction in Aviation Management Programs at U.S. Four-year Colleges and Universities, 2002

Variable	*Statistical Test*	*Test Statistic*	*p-value*
LESSON ONE			
Administrative Approval*	Chi Square	$\chi^2 = 21.563$	.003
Administrative Disapproval	Chi Square	--	
Administrative Involvement*	Chi Square	$\chi^2 = 25.544$	.001
LESSON TWO			
Obstacle — lack of higher-level admin support	Chi Square	$\chi^2 = 6.811$	.449
Obstacle — lack of funding*	Chi Square	$\chi^2 = 14.495$	.043
Inside gifts/grants	Chi Square	--	
Obstacle — lack of course materials	Chi Square	$\chi^2 = 5.714$	.574
Obstacle — lack of trained faculty	Chi Square	$\chi^2 = 9.661$	.209
LESSON THREE			
Faculty with interest in teaching ethics*	Chi Square	$\chi^2 = 12.553$	.084
LESSON FIVE			
Admin support for training aviation profs	1-way ANOVA	f = 0.46	.856
Admin support for funding faculty training	1-way ANOVA	f = 1.50	.205
LESSON SIX			
Outside gifts/grants	Chi Square	--	
Obstacle faced — lack of outside support	Chi Square	$\chi^2 = 4.937$	.668
Accreditation Requirements*	Chi Square	$\chi^2 = 12.287$	.092
Speakers/seminars on ethics in department	Chi Square	$\chi^2 = 11.772$	.108
Speakers/seminars on ethics in industry*	Chi Square	$\chi^2 = 12.320$	.091
LESSON EIGHT			
Obstacle — lack of time in curriculum	Chi Square	$\chi^2 = 7.717$	.358
Obstacle — lack of course materials	Chi Square	$\chi^2 = 5.714$	.574
Obstacle — lack of trained faculty	Chi Square	$\chi^2 = 9.661$	.209
FACTOR ONE			
Administrative Funding	1-way ANOVA	f = 1.62	.170
FACTOR TWO			
Dept Head Experience in Industry	1-way ANOVA	f = 0.77	.617
FACTOR THREE			
Administrative Approval*	Chi Square	$\chi^2 = 21.563$	.003
Administrative Disapproval	Chi Square	--	
Administrative Concern	1-way ANOVA	f = 1.81	.121
Administrative Involvement*	Chi Square	$\chi^2 = 25.544$	.001
FACTOR FOUR			
Obstacle faced — lack of faculty support	Chi Square	$\chi^2 = 4.152$	.762
Faculty members conducted ethics research	Chi Square	$\chi^2 = 9.073$	.247
Faculty with interest in teaching ethics*	Chi Square	$\chi^2 = 12.553$	.084
FACTOR FIVE			
Obstacle faced — lack of outside support	Chi Square	$\chi^2 = 4.937$	.668
Outside gifts/grants	Chi Square	--	
FACTOR SIX			
Accreditation Requirements*	Chi Square	$\chi^2 = 12.287$	.092

Table 1 - continued

Variable	*Statistical Test*	*Test Statistic*	*p-value*
OTHER VARIABLE			
Funding/Sponsorship Category	Chi Square	$\chi^2 = 12.946$	.531
Carnegie Classification Category	Chi Square	$\chi^2 = 25.922$	.867
Department Head Experience as Department Head	1-way ANOVA	f = 0.31	.946
Department Head Experience as Faculty	1-way ANOVA	f = 1.25	.310
School Size	1-way ANOVA	f = 1.72	.140
Admin Position on non-aviation professors teaching ethics	1-way ANOVA	f = 0.65	.711
Admin Position on aviation professors teaching ethics	1-way ANOVA	f = 1.73	.140
Department has code of ethics	Chi Square	$\chi^2 = 4.794$	.685
Department has ethics committee	Chi Square	--	

* Statistically significant results at the p<.10 level
-- Adequate testing could not be done due to lack of variation in survey responses

approval, institutions having department heads who have already supported decisions to include ethics in their schools' curricula are more likely to be those colleges and universities with a higher level of planned ethics inclusion (χ^2 = 21.563, df = 7, p = .003). The same is true regarding administrative approval and departments requiring an ethics course taught outside the department ($\chi^2 = 4.615$, df = 1, p = .032), departments allowing an elective ethics course taught outside the department ($\chi^2 = 4.958$, df = 1, p = .026), and departments offering aviation courses with ethics as one of the planned topics ($\chi^2 = 12.23$, df = 1, p = .001). Also, department heads who have actually taught ethics as part of the curriculum are more likely to represent colleges with a higher EIS level ($\chi^2 = 25.544$, df = 7, p = .001), and they are more likely to represent colleges that offer aviation courses having ethics as one of the planned topics to be covered ($\chi^2 = 22.37$, df = 1, p = .001).

Lesson two — higher-level support

The second hypothesis states that those aviation programs that already have ethics in their curricula are more likely to have higher-level administrative support for doing so as seen in resources for ethics instruction and in recognition given to faculty involved through the tenure and promotion process. If this hypothesis was true, it would be seen in survey data showing that schools with higher EIS levels are associated with department head perceptions that fewer of the following obstacles have or would have to be faced: lack of higher-level administration support, lack of monetary funding, lack of course materials, and lack of trained faculty. One would also expect that schools that had adopted ethics into their curricula would be more likely to have received internal gifts or grants to accomplish this. Tests related to recognition of faculty efforts in the promotion/tenure process were not done in during Part Two.

Table 2. Ethics Instruction Delivery Methods in Relation to the Lessons, Factors and Other Variables Associated with Initiation or Adoption of Effective Ethics Instruction in Aviation Management Programs at U.S. Four-year Colleges and Universities, 2002

Variable	*Required Ethics Course taught outside department*	*Required Ethics Course taught inside department*	*Elective Ethics Course taught outside department*	*Elective Ethics Course taught inside department*	*Aviation Courses with Ethics as Planned Topic*
LESSON ONE					
Administrative Approval	$\chi^2 = 4.615$ $p = .032$*	$\chi^2 = 2.06$ $p = .151$	$\chi^2 = 4.958$ $p = .026$*	--	$\chi^2 = 12.23$ $p = .001$*
Administrative Disapproval	--	--	--	--	--
Administrative Involvement	$\chi^2 = 0.30$ $p = .585$	$\chi^2 = 0.13$ $p = .715$	$\chi^2 = 0.09$ $p = .767$	--	$\chi^2 = 22.37$ $p = .001$
LESSON TWO					
Obstacle — lack of higher-level administrative support	$\chi^2 = 0.78$ $p = .376$	$\chi^2 = 0.78$ $p = .376$	$\chi^2 = 1.34$ $p = .247$	--	$\chi^2 = 0.908$ $p = .341$
Obstacle — lack of funding	$\chi^2 = 1.08$ $p = .298$*	$\chi^2 = .22$ $p = .643$*	$\chi^2 = 1.43$ $p = .232$*	--	$\chi^2 = 1.05$ $p = .306$*
Inside gifts/grants	--	--	--	--	--
Obstacle — lack of course materials	$\chi^2 = 4.318$ $p = .038$	$\chi^2 = 1.38$ $p = .240$	$\chi^2 = 0.11$ $p = .736$	--	$\chi^2 = 0.90$ $p = .344$
Obstacle — lack of trained faculty	$\chi^2 = 0.11$ $p = .736$	$\chi^2 = 2.64$ $p = .104$	$\chi^2 = 0.59$ $p = .444$	--	$\chi^2 = 6.61$ $p = .010$

Table 2. – continued

Variable	*Required Ethics Course taught outside department*	*Required Ethics Course taught inside department*	*Elective Ethics Course taught outside department*	*Elective Ethics Course taught inside department*	*Aviation Courses with Ethics as Planned Topic*
LESSON THREE					
Faculty with interest in teaching ethics	$\chi^2 = 3.644$ p = .056*	$\chi^2 = 12.088$ p = .001*	$\chi^2 = 2.38$ p = .123	--	$\chi^2 = 2.72$ p = .099*
LESSON FIVE					
Administrative support for training aviation professors	t = -1.57 p = .136	t = -0.19 p = .427	t = -0.64 p = .524	--	t = 0.24 p = .810
Administrative support for funding faculty training	t = 1.351 p = .102	t = -4.466 p = .0001*	t = .623 p = .537	--	t = -1.75 p = .092*
LESSON SIX					
Outside gifts/grants	--	--	--	--	--
Obstacle — lack of outside support	$\chi^2 = 0.06$ p = .815	$\chi^2 = 0.37$ p = .542	$\chi^2 = 1.79$ p = .181	--	$\chi^2 = 2.21$ p = .137
Accreditation Requirements	$\chi^2 = 7.828$ p = .005*	$\chi^2 = 0.01$ p = .976	$\chi^2 = 1.39$ p = .238	--	$\chi^2 = 2.72$ p = .099*
Speakers/seminars on ethics in department	$\chi^2 = 0.33$ p = .568	$\chi^2 = 0.92$ p = .337	$\chi^2 = 0.03$ p = .853	--	$\chi^2 = 2.11$ p = .147
Speakers/seminars on ethics in industry	$\chi^2 = .17$ p = .684	$\chi^2 = 1.74$ p = .187	$\chi^2 = 1.46$ p = .228	--	$\chi^2 = 5.55$ p = .019*

Table 2. – continued

Variable	*Required Ethics Course taught outside department*	*Required Ethics Course taught inside department*	*Elective Ethics Course taught outside department*	*Elective Ethics Course taught inside department*	*Aviation Courses with Ethics as Planned Topic*
LESSON EIGHT					
Obstacle — lack of time in curriculum	$\chi^2 = 0.43$ p = .512	$\chi^2 = 0.04$ p = .837	$\chi^2 = 0.75$ p = .387	--	$\chi^2 = 0.16$ p = .692
Obstacle — lack of course materials	$\chi^2 = 4.318$ p = .038*	$\chi^2 = 1.38$ p = .240	$\chi^2 = 0.11$ p = .736	--	$\chi^2 = .90$ p = .344
Obstacle — lack of trained faculty	$\chi^2 = 0.11$ p = .736	$\chi^2 = 2.64$ p = .104	$\chi^2 = 0.59$ p = .444	--	$\chi^2 = 6.61$ p = .010*
FACTOR ONE					
Administrative Funding	t = 1.31 p = .110	t = -2.82 p = .017*	t = 0.37 p = .356	--	t = -2.10 p = .023
FACTOR TWO					
Department Head Experience in Industry	t = 0.87 p = .401	t = 0.24 p = .820	t = 0.46 p = .652	--	t = 1.09 p = .285
FACTOR THREE					
Administrative Approval	$\chi^2 = 4.615$ p = .032*	$\chi^2 = 2.06$ p = .151	$\chi^2 = 4.958$ p = .026*	--	$\chi^2 = 12.23$ p = .001*
Administrative Disapproval	--	--	--	--	--

Table 2. – continued

Variable	*Required Ethics Course taught outside department*	*Required Ethics Course taught inside department*	*Elective Ethics Course taught outside department*	*Elective Ethics Course taught inside department*	*Aviation Courses with Ethics as Planned Topic*
Factor Three – continued					
Administrative Concern	t = -1.04 p = .322	t = -4.33 p = .004*	t = -0.43 p = .671	--	t = -0.466 p = .644
Administrative Involvement	χ^2 = .30 p = .585	χ^2 = 0.13 p = .715	χ^2 = 0.09 p = .767	--	χ^2 = 22.37 p = .001*
FACTOR FOUR					
Obstacle — lack of faculty support	χ^2 = 0.08 p = .782	χ^2 = 1.33 p = .249	χ^2 = 0.21 p = .647	--	χ^2 = 0.04 p = .845
Faculty members conducted ethics research	χ^2 = 0.79 p = .376	χ^2 = 2.04 p = .153	χ^2 = 0.68 p = .409	--	χ^2 = 0.10 p = .748
Faculty with interest in teaching ethics	χ^2 = 3.644 p = .056*	χ^2 = 12.088 p = .001*	χ^2 = 2.38 p = .123	--	χ^2 = 2.72 p = .099*
FACTOR FIVE					
Obstacle — lack of outside support	χ^2 = 0.06 p = .815	χ^2 = 0.37 p = .542	χ^2 = 1.79 p = .181	--	χ^2 = 2.21 p = .137
Outside gifts/grants	--	--	--	--	--
FACTOR SIX					
Accreditation Requirements	χ^2 = 7.828 p = .005*	χ^2 = 0.01 p = .976	χ^2 = 1.39 p = .238	--	χ^2 = 2.72 p = .099*

Table 2. – continued

Variable	*Required Ethics Course taught outside department*	*Required Ethics Course taught inside department*	*Elective Ethics Course taught outside department*	*Elective Ethics Course taught inside department*	*Aviation Courses with Ethics as Planned Topic*
OTHER VARIABLES					
Funding/Sponsorship Category	$\chi^2 = 0.90$ p = .638	$\chi^2 = 0.71$ p = .703	$\chi^2 = 0.58$ p = .749	--	$\chi^2 = 2.45$ p = .294
Carnegie Classification Category	$\chi^2 = 3.66$ p = .600	$\chi^2 = 5.14$ p = .399	$\chi^2 = 2.90$ p = .715	--	$\chi^2 = 5.02$ p = .413
Department Head Experience as Department Head	t = -0.51 p = .624	t = 0.24 p = .825	t = 0.19 p = .854	--	t = -0.83 p = .415
Department Head Experience as Faculty	t = -0.20 p = .847	t = 0.18 p = .868	t = -0.14 p = .888	--	t = -0.14 p = .891
School Size	t = -0.34 p = .742	t = 4.537 p = .0001*	t = -1.41 p = .167	--	t = -0.56 p = .577
Administrative Position on non-aviation professors teaching	t = -2.591 p = .011*	t = 1.584 p = .086*	t = 0.15 p = .442	--	t = 0.94 p = .356
Administrative Position on aviation professors teaching	t = 0.93 p = .186	t = -2.014 p = .057*	t = 1.712 p = .048*	--	t = -0.44 p = .665
Department has code of ethics	$\chi^2 = 0.83$ p = .361	$\chi^2 = 0.12$ p = .729	$\chi^2 = 1.67$ p = .196	--	$\chi^2 = 1.78$ p = .182
Department has ethics committee	--	--	--	--	--

* Statistically significant results at the p<.10 level
-- Adequate testing could not be done due to lack of variation in survey responses

Results of statistical tests comparing the EIS level and ethics education delivery methods with survey data on obstacles to incorporating ethics in aviation curricula and on internal gifts and grants are shown in tables 1 and 2. Regarding perceptions about lack of higher-level administrative support, only 6 of 40 department heads (15%) reported that they have or would have to overcome lack of higher-level administrative support. Although 3 of the 6 were at the lowest level of planned ethics inclusion, statistical tests did not show significant differences between this obstacle and levels of planned inclusion.

Concerning lack of funding, 18 of 39 department heads (46%) responding to this question said this has been or would be an obstacle for their departments. Data show that there are significant differences between levels of planned inclusion and the existence of this obstacle ($\chi^2 = 14.495$, df = 7, p = .043). Interestingly, though, in levels 1 through 3, 9 of 17 department heads (53%) say funding would be a problem, while at Level 9, all 5 department heads say it was a problem. Most of those in between these levels (3 of 13 or 23%) do not consider this a problem. Thus, funding may be holding back those at the lower levels while all those at the pervasive level (Level 9) have fought through and overcome the funding issue in order to establish ethics as a pervasive part of their curricula. In the funding arena, none of the responding department heads reported that they had received university funding from outside their departments for the express purpose of establishing ethics as part of their curricula.

There were no significant differences between levels of planned ethics inclusion and the obstacle of lack of course materials. Those department heads that cited lack of course materials as an obstacle represented departments across several EIS levels. However, it is noteworthy that of the 37 department heads responding to the question about lack of course materials, all 11 who answered that this would be a problem represented schools that had EIS levels between 1 and 5. Therefore, those who have gone the furthest in incorporating ethics in their curricula have not experienced this problem. They found materials somewhere, or they relied on other academic departments to teach the material and did not need their own materials. Supporting this observation is the fact that all 8 department heads of the departments requiring an ethics course for graduation and having it taught outside the aviation department report that course materials are not a problem. This result is statistically significant ($\chi^2 = 4.318$, df = 7, p = .038).

There were no significant differences between level of planned ethics inclusion and the obstacle of lack of trained faculty. However, once again it is interesting to note the response distribution. Of the 39 departments with a tabulated level of planned ethics inclusion, department heads from 36

responded to this question. Of these 36, 16 (44%) said that lack of trained faculty would be a problem. However, of the 16, 13 (81%) represent colleges that had levels of planned ethics inclusion from 1 to 5. Thus, those who have done the most to include ethics instruction stated that they had not experienced this problem. Two explanations exist. First, this problem is perceived by those at the lower levels, and this perceived problem is holding them back from including more ethics. Second, the schools at the higher EIS levels are the ones having faculty interested in ethics (this is true as will be discussed shortly), and therefore, they do not see training as an obstacle. Another statistically significant comparison adds weight to the latter suggestion. Department heads from those departments that incorporate ethics as a planned topic in aviation coursework are less likely to state that lack of trained faculty is an obstacle to teaching ethics than those department heads from departments not incorporating ethics as a planned topic in aviation courses ($\chi^2 = 6.61$, df = 1, p = .010).

Lesson three — importance of departmental advocates

The hypothesis from the third lesson from other curricular areas states that those aviation departments already having ethics as part of their curriculum are more likely to have department head support for it or at least one aviation professor leading such efforts. The importance of department head support will be discussed later when discussing the third factor of educational change. Results of tests comparing EIS levels and ethics instruction delivery methods with faculty interest in teaching ethics are displayed in tables 1 and 2.

To determine whether there is support for the idea that individual professors can have an impact on including ethics instruction, a supplementary statistical test was employed to study distributions from the survey data between some of the levels of planned ethics inclusion and the responses showing departments with faculty members who have demonstrated an interest in teaching ethics or have initiated efforts to do so. Specifically, EIS levels 2 and 4 through 9 include aviation departments that have some form of ethics instruction for students that is provided by the aviation faculty. One would expect that these departments would have more faculty members with a demonstrated interest in teaching ethics than departments at levels 1 and 3, which have no aviation professors teaching ethics. The response distribution certainly supports this. At levels 2 and 4 through 9, 9 of 23 departments (39%) have professors interested in teaching ethics. At levels 1 and 3, only 2 of 16 departments (13%) have faculty members interested in ethics instruction. A chi square test of this distribution confirms statistical significance ($\chi^2 = 3.305$, df = 1, p = .069).

Especially notable is the fact that 3 of 4 departments at level 2 have faculty members interested in teaching ethics. Having such faculty who are interested in teaching ethics is possibly the way in which departments that are currently at higher levels of planned ethics inclusion began to change their curricula to include more ethics instruction. Promoting and sustaining that degree of interest among all faculty members appears to be a problem at the higher levels as only 2 of the 7 universities at EIS levels of 8 and 9 have faculty members interested in teaching ethics. Nevertheless, there are significant differences between EIS levels based on the variable of faculty interest ($\chi^2 = 12.553$, df = 7, p = .084).

Several more specific statistical results add support to the importance of faculty interest. Departments requiring an ethics course that is taught from outside the aviation department are less likely to have aviation faculty members with a demonstrated interest in teaching ethics ($\chi^2 = 3.644$, df = 1, p = .056). In fact, none of the 8 department heads from such departments reported that they had any faculty members interested in teaching ethics. In contrast, departments requiring students to take an ethics course taught by aviation professors and departments offering aviation courses that include ethics as a planned topic are more likely to have faculty members with a demonstrated interest in teaching ethics ($\chi^2 = 12.088$, df = 1, p = .001 and $\chi^2 = 2.72$, df = 1, p = .099, respectively). All 4 department heads from aviation departments teaching their own required ethics course reported they had faculty members interested in teaching ethics, as did the department head of the only aviation department that offers an elective ethics course taught by an aviation professor. This substantiates the hypothesis that interested faculty members can have an impact on including ethics in the curriculum.

Lesson four — the pervasive method

Lesson four drawn from other academic areas states that those aviation departments that do the best job of including ethics in their curricula use the pervasive method to do so. A department using the pervasive method would do all of the following: a) require its students to take an ethics course, b) allow students to take elective ethics courses, and c) include ethics as a planned topic of discussion at all appropriate places in other courses in the curriculum. Other curricular areas deemed this as best because it saturates all areas of a curriculum with ethics and shows that everyone teaching in the area is unified in raising the importance of ethics.

Although the pervasive approach as just described is assumed to be the best method for including ethics in the curriculum due to findings in Part One (Oderman, 2002), this study did not test the quality of ethics inclusion

in the curricula of any aviation administration departments. This study only assigned a descriptive label called level of planned ethics inclusion to each responding higher education institution. Using this definition of pervasive methodology, only 5 of the participating 41 colleges and universities (12%) have already established programs that would be classified as Level 9 (pervasive) on the EIS. Thus in terms of description, aviation management programs have a long way to go to be classified as pervasive.

Lesson five — involvement and training of faculty

According to the fifth hypothesis, those aviation management departments that desire to do the best job of incorporating ethics in their curricula are more likely to have many faculty members teach the subject internally and are more likely to provide training to their faculty to accomplish this. As with the previous lessons, the intent of this study was not to evaluate the quality of faculty involvement in the teaching of ethics. Nor did the study attempt to quantify the number or percentage of faculty members involved in teaching ethics. Additionally, all data collected about faculty involvement was secondhand, i.e. in the eyes of the department head. Thus, information about actual faculty involvement is limited to what department heads know about what their faculty members are doing in the classroom. This may be very limited since professors have much freedom in the classroom.

Nevertheless, although the study did not directly test the fifth hypothesis, some related data deserves mention as background information for future research. Even though the survey instrument used did not specifically ask for the number of aviation department faculty members who currently teach ethics either as a required course principally devoted to ethics or as a planned topic in other courses devoted to other subject areas, some indirect data indicate that few aviation professors currently teach anything about ethics. Department heads were asked their opinion about whether ethics should be taught in all applicable aviation courses whenever topics related to ethics are appropriate to the courses being taught. Almost all (39 of 40; 98%) of the department heads responding to this question *strongly agreed* or *agreed* that this should be done, but in terms of actual practice, only 4 aviation administration departments teach their own required ethics course, and only 22 aviation departments teach ethics as a planned topic in other aviation courses. Of the 22 teaching ethics as a planned topic, only 8 (36%) answered that they have more than two aviation courses with ethics as a planned topic. Thus, it appears probable that one or just a couple of professors in most departments are involved with teaching anything at all about the subject of ethics.

All department heads were asked for their opinion about training aviation faculty members who teach ethics and about funding this training. Tables 1 and 2 show the results of statistical tests comparing these two variables with EIS level and ethics instruction delivery method. Most (35 of 40; 88%) of the department heads responding to this question *strongly agreed* or *agreed* that such training should be done. Yet, only 24 of 40 (60%) *strongly agreed* or *agreed* that given present departmental funding they would be willing to devote funds to training. There were no statistically significant tests showing any relationship between administrative support for training and how ethics is currently being handled in departmental curricula; thus, this situation is common to all.

However, regarding department head support for funding faculty training, department heads representing those aviation departments which teach their own required ethics course and those which offer aviation courses in which ethics is a planned topic of instruction are more inclined to be willing to fund faculty training ($t = -4.466$, $df = 35$, $p = .0001$, and $t = -1.75$, $df = 26$, $p = .092$, respectively). Another interesting test result is one that approaches significance. Department heads from departments that require an ethics course that is taught outside the department are less inclined to support funding of faculty training ($t = 1.351$, $df = 11$, $p = .102$).

Lesson six — influence of outside support

The sixth lesson hypothesis from other academic areas states that those aviation programs that already incorporate ethics in their curricula are more likely to have been influenced by outside agencies in the form of supporting resources or accreditation requirements.

Five questions related to this hypothesis were examined during this study. Interestingly, the first of these questions revealed that none of the participating department heads reported that their departments had received any outside gifts or grants to specifically fund the incorporation of ethics into their curricula. However, in response to a related question, only 4 of 39 (10%) stated that the lack of outside support was or would be an obstacle to the inclusion of ethics in their curricula. Outside giving could be a catalyst for initiating ethics instruction if such funding was offered, but in general, department heads do not regard the lack of outside funding as an obstacle to getting started.

Regarding accreditation, 10 colleges and universities responded that accrediting agencies require them to include ethics in their curricula. Needless to say, all 10 schools include ethics, but the methods for inclusion differ. Five of them require a course wholly devoted to ethics, but in each case these courses are taught outside the aviation department. Four departments cover their ethics requirement by teaching ethics as a planned

topic in other aviation courses. Only one school covers the requirement with a required course taught within the aviation department. A statistical test regarding accreditation requirements and level of planned ethics inclusion shows that schools with accreditation requirements are more likely to have higher levels of planned inclusion (χ^2 = 12.287, df = 7, p = .092). Statistical analysis also shows that aviation departments with an ethics component in their accreditation requirements are more likely to have a required ethics course that is taught outside their department (χ^2 = 7.828, df = 1, p = .005). The reason the course is taught outside the department may be that the requirement is regarded as unwelcome or burdensome, and thus, the teaching of ethics is farmed out to another department at the university. Another possibility is that departments consider it more cost effective to require students to take an existing course in another department rather than add a new course to their own departments' course offerings. Aviation departments that have an ethics component in their accreditation requirements are also more likely to offer aviation courses that have ethics as a planned topic of discussion (χ^2 = 2.72, df = 1, p = .099).

This study did not get into the issue of aviation industry professionals helping with ethics course development; however, questions were asked about the use of guest speakers, seminars and educational meetings in relation to ethical issues. Twelve of 41 departments (29%) have hosted such activity in relation to including ethics in the curriculum. Eighteen of 41 departments (44%) have done this in relation to ethical issues in the aviation industry. Those departments that have hosted speakers and seminars to address issues related to ethics in the industry are more likely to represent those with a higher level of planned inclusion (χ^2 = 12.320, df = 7, p = .091). Those aviation departments are also more likely to offer aviation courses in which ethics is discussed as a planned topic among others (χ^2 = 5.55, df = 1, p = .019). Thus, industry assistance in bringing relevant information on the subject of ethics is available to institutions of higher education, and it is being utilized by some of them.

Lesson seven — modeling

The hypothesis from lesson seven says that those aviation departments that want to be most effective in their presentation of ethics will be those in which faculty and staff members model the principles they are teaching. This lesson was not assessed during this part of the study because it can not be studied quantitatively.

Lesson eight — obstacles

The hypothesis from the eighth and final lesson states that the principal obstacles that aviation departments face when initiating ethics education are lack of time in an already-packed curriculum, lack of good course materials, and lack of trained faculty.

In an open-ended question, the survey instrument asked department heads to list the greatest obstacle that they have overcome or would expect to have to overcome if they wanted to include ethics in their curricula. Of 28 department heads responding to this question, 16 (67%) listed lack of time in an already-packed curriculum. This obstacle was not statistically significant with respect to EIS level, nor was it significant with respect to current practices for including ethics in the curriculum. The distribution of survey responses show that this obstacle is experienced or is expected to be faced by those who include ethics and those who do not.

Thirty percent of department heads think that lack of course materials is an obstacle. However, statistical analysis shows that department heads who think that lack of course materials is not an obstacle are more likely to be the ones who require that ethics be taught from outside the aviation department ($\chi^2 = 4.318$, df = 1, p = .038). In fact, 8 aviation departments require an ethics course taught by professors from outside the department, and none of the department heads from these departments think that a lack of course materials presents an obstacle. The reason is immediately apparent: it is not an obstacle because someone external to the aviation department is providing the instruction. One wonders if this would be an obstacle if their department had to provide the instruction.

Concerning lack of trained faculty, 17 of 38 department heads (45%) agree that this was or would be an obstacle. Four of the 28 department heads responding to the open-ended question listed "lack of trained faculty" as the greatest obstacle. Statistical analysis shows that department heads from departments that offer aviation courses with ethics as a planned topic are less inclined to say that lack of trained faculty is or would be an obstacle ($\chi^2 = 6.61$, df = 1, p = .010). Two possible explanations exist, and both may be true. First, department heads who do not think this is an obstacle are the ones who have interested faculty members who develop an ethics component in their aviation courses. Second, department heads who think lack of training is a problem do not encourage ethics as a planned topic of discussion in aviation courses.

A Comparison with Lessons from Fullan and Stiegelbauer

In Part One (Oderman, 2002) of this study, educational change was discussed. Fullan and Stiegelbauer (1991) list seven factors affecting

initiation of educational change that have implications for initiating ethics education programs in aviation curricula. Six were investigated during this part of the study.

Factor one — connection between publications and change

As applied to the initiation of ethics instruction in aviation management curricula, the hypothesis concerning factor one says that aviation departments will be hesitant to initiate and fund ethics instruction programs because little has been published on the subject within the aviation academic community. While the survey instrument did not refer to a lack of published articles about ethics in aviation programs and its relationship to initiating or funding ethics instruction, the survey did ask questions about funding issues in the current context of no published articles. Sixteen of 40 department heads (40%) registered disagreement with or ambivalence toward using current funds to train aviation professors to teach ethics. Twenty-one of 41 (51%) expressed the same opinion toward using current funds to initiate or enhance the teaching of ethics to students in their departments. Nineteen of 40 (48%) either disagree with or are ambivalent to using current funds to develop course materials for ethics instruction in aviation. The distribution of responses to questions about funding shows that fairly large percentages of department heads would not support funding ethics instruction at the present time. One wonders whether department heads' views would change if articles were published in aviation journals or other media which demonstrated the need for collegiate ethics instruction.

Statistical tests comparing level of planned inclusion and ethics instruction methods to funding issues were completed and results are shown in tables 1 and 2. It is very interesting to note the results of two of these tests. Aviation departments that have department heads who are more willing to fund efforts to advance ethics instruction in the department are more likely to require students to complete ethics courses that are taught by aviation professors and are more likely to offer aviation courses that have ethics as a planned topic among other topics ($t = -2.82$, $df = 5.5$, $p = .017$ and $t= -2.10$, $df = 27.4$, $p = .023$, respectively).

Additionally, a supplementary one-sided t-test was performed to compare department head willingness to fund the initiation of ethics instruction with whether aviation departments were requiring or offering ethics education by any method in which aviation professors do the teaching (EIS levels of 2 and 4 through 9). Aviation departments having department heads willing to fund such efforts are more likely to do their own ethics instruction ($t = -2.165$, $df = 26.5$, $p = .020$).

Factor two — experience as a motivator

The hypothesis dealing with the second factor from Fullan and Stiegelbauer (1991) states that aviation departments that currently incorporate ethics in their curricula are more likely to have department heads with greater experience in the aviation industry. Department heads were asked to list the number of years they had served in the aviation industry since they earned their baccalaureate degrees (not including academic experience). The average number of years of experience was 18.3, with a standard deviation of 11.2 years and a range of 0-39 years. There was not a statistically significant relationship between department head industrial experience and either EIS level or any of the methods of delivering ethics instruction. Thus, industry experience of department heads is not a factor by which one can predict whether or how ethics is included in the curricula. The reason will be examined in Part Three of this study.

Factor three — importance of administrative advocacy

According to Fullan and Stiegelbauer (1991), educational change, such as initiating the inclusion of ethics in the curriculum, is more likely to occur when a chief administrator advocates it. The hypothesis from this third factor states that aviation management departments that currently include ethics in their curricula are more likely to have department heads that support such efforts. This hypothesis receives much support.

First, those institutions with department heads who have actually supported a decision to include ethics in the aviation curriculum are more likely to have higher levels of planned ethics inclusion ($\chi^2 = 21.563$, df = 7, p = .003). In fact, there are no colleges or universities with a level of planned ethics inclusion of 5 or higher whose department head has not already supported a decision to include ethics in the curriculum. Second, departments with department heads who have already supported a decision to include ethics in the aviation curriculum are more likely to require an ethics course taught from outside the aviation department ($\chi^2 = 4.615$, df = 1, p = .032). Third, departments having a department head who has already supported a decision to include ethics in the aviation curriculum are more likely to allow students to take elective ethics courses taught outside the department for graduation credit ($\chi^2 = 4.958$, df = 1, p = .026). Fourth, departments having a department head who has already supported a decision to include ethics in the aviation curriculum are more likely to require or allow students to take aviation courses that have ethics as one of the planned topics to be covered ($\chi^2 = 12.23$, df = 1, p = .001). Fifth, departments with a department head who has actually taught ethics in some

way in the aviation curriculum are more likely to have a higher level of planned inclusion and are more likely to require or allow students to take aviation courses that have ethics as one of the planned topics to be covered ($\chi^2 = 25.544$, df = 7, p = .001 and $\chi^2 = 22.37$, df = 1, p = .001 respectively). Finally, aviation departments with department heads who have a higher level of administrative concern for including ethics are more likely to require an ethics course that is taught from within the department (t = -4.33, df = 6.7, p = .004).

Factor four — importance of professor advocacy

The hypothesis based on the fourth factor states that those aviation programs that have ethics as part of their curricula are more likely to have at least one professor with a demonstrated interest in teaching ethics. It should be emphasized that aviation faculty interest in ethics is rather low in terms of numbers. Only 11 of the 41 aviation department heads surveyed (27%) report having faculty members with a demonstrated interest in teaching ethics, and only 3 of 41 (7%) have faculty members who have conducted research in the area of ethics. Eleven of 38 department heads even believe that lack of faculty support would be an obstacle to bringing ethics into the aviation curriculum. Nevertheless, as shown on tables 1 and 2 and as discussed earlier in lessons three and five from other academic areas, the importance of professor advocacy has been confirmed by tests showing that aviation departments that have faculty members with a demonstrated interest in teaching ethics are more likely to require students to take an ethics course taught by aviation professors ($\chi^2 = 12.088$, df = 1, p = .001), and they are more likely to teach aviation courses in which ethics is a planned topic of discussion ($\chi^2 = 2.72$, df = 1, p = .099). At the same time, those aviation departments that do not have faculty members with a demonstrated interest in teaching ethics but that do require students to take an ethics course are more likely to require an ethics course that is taught by professors from outside the aviation department ($\chi^2 = 3.644$, df = 1, p = .056). The results of these tests are not surprising as collegiate faculty members typically bring their expertise to the classroom and in some cases are hired for their particular expertise. Thus, an aviation professor with expertise and interest in the area of aviation ethics would naturally bring this subject area to the classroom. It is unlikely though that expertise in ethics would be a hiring point for aviation professors; this author has seen numerous position announcements in the aviation field over the past seven years, and ethics expertise has not been listed in any of them.

Factor five — importance of external change agents

The fifth factor from Fullan and Stiegelbauer (1991) deals with the impact of external change agents. The hypothesis states that aviation departments that currently include ethics in their undergraduate programs are more likely to have been influenced by organizations outside the university in the form of requests or provision of resources to include ethics in the curriculum. Responses to two of the survey questions are relevant here. Department heads were asked if the lack of support from outside the university would be an obstacle to incorporating ethics instruction into the curriculum. Only 4 of 39 respondents (10%) affirmed this, and this was not statistically significant in any tests dealing with the manner in which higher education institutions currently include ethics. The second question asked if any departments had received gifts or grants earmarked for the incorporation of ethics into the curriculum; all 40 of the department heads responding to this question said no. So although the lack of outside support is not viewed as an obstacle to establishing ethics in the aviation curriculum, support from outside the university has not been forthcoming in the form of financial assistance. Thus, this finding of negligible impact of external agents is congruent with the low level of ethics inclusion in aviation curricula existing today.

Factor six — importance of accrediting agencies

The sixth factor drawn from Fullan and Stiegelbauer (1991) concerns the impact of policies of regulatory agencies, which on the collegiate level includes accrediting agencies. The hypothesis states that aviation departments that presently include ethics in their curricula are more likely to have accreditation standards requiring ethics instruction. This item was discussed in lesson six from other academic areas, but three significant findings bear repeating. First, schools with accreditation requirements are more likely to have higher EIS levels ($\chi^2 = 12.287$, df = 7, p = .092). Second, aviation departments with an ethics component in their accreditation requirements are more likely to have a required ethics course that is taught outside their department ($\chi^2 = 7.828$, df = 1, p = .005), and they are more likely to offer aviation courses which include ethics as a planned topic ($\chi^2 = 2.72$, df = 1, p = .099).

Other Variables

Other data were collected and statistically tested that did not directly pertain to the lessons learned from other academic areas or the factors proposed by Fullan and Stiegelbauer (1991). Some brief comments on the

results of these tests are in order.

First, in the area of school categories, neither of the two classification systems used correlated statistically with either EIS level or ethics instruction delivery method. This was somewhat surprising, as it seemed to be intuitively obvious that private universities having a religious sponsor would be more likely than public and private-secular universities to have ethics in their curricula. A possible explanation is that ethics could be an included topic in Bible study or theology courses that are part of the core curricula at such schools, but which would fall outside the scope of this study because these courses do not specifically have ethics as their principal focus, nor are they taught within the aviation department.

In the area of department head experience, the number of years that department heads have in academia as a department head or as a faculty member did not have any relationship with how college and university aviation departments were requiring or offering ethics as part of their curricula.

Concerning aviation department characteristics, the number of students in individual aviation departments did not correlate statistically with ethics instruction methods, with one exception. The four aviation departments that require students to complete an ethics course taught by aviation faculty members had a much smaller student body size (32 students) than the average student body (104 students) of those departments which do not require an ethics course taught inside the department ($t = 4.537$, $df = 37.9$, $p = .0001$).

Related to department head opinions about who should teach ethics, either aviation professors or professors from other departments, four statistically significant findings deserve mention. First, aviation departments with department heads who express higher levels of agreement with the statement that ethics courses should be taught outside the department are more likely to require their students to take an ethics course that is taught by professors outside the aviation department ($t = -2.591$, $df = 13.6$, $p = .011$). Second, aviation departments having department heads who express lower levels of agreement with the statement that ethics courses should be taught outside the aviation department are more likely to require students to take an ethics course taught within the aviation department ($t = 1.584$, $df = 5.3$, $p = .086$). Third, aviation departments with department heads who express higher levels of agreement with the position that ethics should be taught inside the department are more likely to require students to take an ethics course that is taught by aviation professors ($t = -2.014$, $df = 4.1$, $p = .057$). Fourth, aviation departments having department heads who express lower levels of agreement with the position that ethics courses should be taught by aviation professors are more likely

to offer students the option of taking an elective ethics course for graduation credit that is taught by a professor outside the aviation department ($t = -1.712$, $df = 34.9$, $p = .048$). There is nothing unexpected about any of these results.

Regarding organizational culture, neither a departmental code of ethics nor a departmental ethics committee showed a statistically significant correlation to the delivery of ethics education to aviation administration students.

CONCLUSION

Summing up, the author conducted a detailed statistical analysis of response data to an investigative survey instrument distributed to department heads of collegiate aviation management programs throughout the U.S. to analyze factors influencing the current state of ethics education within such departments. The statistical tests supported the preliminary assumption that not much is being done at the present time to incorporate ethics education into the curricula of collegiate aviation management programs. The data did demonstrate, however, that strong interest in this subject on the part of department heads and/or faculty members did have a positive impact on the inclusion of ethics in the curriculum.

Before discussing the implications of this data and making recommendations, the author decided to delve more deeply into the reasons behind the data findings. To do this, he began a third part of the study, a qualitative analysis, by conducting more detailed interviews with a representative sample of department heads and with faculty members who had demonstrated an interest in teaching ethics. The results of these interviews will be discussed in Part Three of this report, along with recommendations for future practice.

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