The Use of Technology in Collegiate Aviation Programs

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ABSTRACT

With introduction of Technically Advanced Aircraft (TAA) and advanced Global Positioning Systems (GPS), a blind survey was designed to measure the extent of technology utilized in collegiate aviation programs. University Aviation Association (UAA) member institutions completed an online Likert Scale survey focusing on the perception of technology utilization within each aviation program. The survey questioned respondents regarding technology support, aircraft cockpit design, classroom accessories, internet resources, training facilities, and other miscellaneous areas regarding technology. The study was designed to aid university administrators when planning future technology implementation.

INTRODUCTION

The University Aviation Association (UAA) is a nonprofit organization consisting of 115 institutions representing academic and aviation industry with over 800 members. The UAA has strengthened aviation education and training within collegiate setting through scholarships, research, and student support. The organization provides a strong liaison between collegiate aviation and industry and continues to be at the forefront of aviation education and training improvement. Currently, there are 46 academic UAA member institutions providing aviation training and education.

UAA member institutions were selected for study participation due to their driving force within the aviation industry, leadership within the collegiate setting, and access to current technological advancements. This study was created to examine technology utilized within UAA member aviation programs. Respondents completed an online Likert Scale survey focused on their perception of technology used within UAA aviation programs. The focus of this study was to illustrate current technology trends and aid university administrators in future technology planning and implementation.

REVIEW OF LITERATURE

Past studies focused on effects of technology implementation upon transfer of learning. For example, Witiw and Kelly-Benjamin (1997) compared student performance in a technology-enhanced aviation meteorology course. They found the control group showed increased conceptual basic meteorology knowledge over two experimental groups. Howell, Denning, and Fizpatrick (2003) examined associated effects on university student achievement when provided with traditional printed lecture handouts versus electronically retrieved handouts. They found no statistical difference between electronic and traditional delivery of specific course materials.

Articles have focused on technology within classroom settings. Karp (2000) remarked on how computer-based training (CBT) and personal computer-based aviation training devices (PCATDs) aid in knowledge retention of aviation students. Burgener (2005) reported how technology implementation transfers digital video technology to overhead projectors in classroom settings. In “The Technological Revolution Comes to the Classroom,” Konza & Johnston (1991) wrote, “faculty members need to see how creative and effective teachers change the curriculum, their assignments, the arrangement of the classroom, and the ways students interact when they introduce technology into their courses” (p.10).

The internet has become an integral part within the higher education system. However, this technology has not been without limitations. Simmons (2005) addressed concerns utilizing internet-based resources for use during instruction of undergraduate airline management

courses. These concerns included information that was out-dated, unreliable, or not always available for retrieval.

With the emergence of technically advanced aircraft (TAA), technology has influenced the cockpit, as well as the classroom. This paper examined technology trends in UAA collegiate aviation programs.

TECHNOLOGY SURVEY

Forty-six UAA member institutions were invited by e-mail to participate in an online blind study consisting of twenty-two questions (See Appendix). The survey focused on different uses of technology within each institution's program. Seventy-three percent of UAA member institutions completed the online survey with seventy-nine percent of respondents being four-year institutions.

Various programs offered in collegiate aviation were represented. Ninety-seven percent of the 34 respondents offered aviation flight-training programs and eighty-five percent offered aviation management programs. Twenty-six percent offered aviation maintenance (Airframe and/or Powerplant Maintenance) programs. (See Table 1).

Respondents ranked university support in utilization of technology on a scale ranging from poor to excellent. Over eighty percent of respondents indicated support from university administration, deans, and chairs ranging from average to excellent. Only one institution reported poor support from the chair of the department. (See Table 2)

Respondents ranked aircraft technology and indicated their choice from strongly agreeing, to strongly disagreeing with selected statements. Sixty-one percent agreed technically advanced aircraft were utilized in their programs. Eighty-five percent of institutions polled indicated use of Global Positioning Systems (GPS). (See Table 3)

Questions concerning technology use in the classroom were solicited. One hundred percent of respondents indicated they talked about aircraft technology in the classroom. Eighty-two percent indicated demonstrating aircraft technology with computer programs in the classroom. (See Table 4)

Participants were polled on technology use in classroom settings. Seventy-eight percent indicated computers were installed within the classroom. Ninety percent of respondents indicated installed VCRs, ninety-three percent indicated installed DVDs, and eighty-one percent indicated having LCD projectors within the classroom setting. (See Table 5)

Concerning software utilization, eighty-four percent indicated they were using some type of training program (Microsoft Flight Simulator®, Elite®, Jeppesen Sim Charts®, etc.). Fifty-seven percent indicated use of technical training software such as Vector Aircraft Systems®, aircraft system CBT training, etc. (See Table 6).

Next addressed were class management tools available to instructors. Ninety-three percent indicated use of PowerPoint®, seventy-five percent indicated use of WebCT® or Blackboard®, and sixty-one percent conduct online quizzes. Fifty-eight percent conducted online assessments and sixty-five percent use online services to distribute class syllabi. Sixty-seven percent utilized WebCT® or Blackboard® to distribute documents used in the course including lecture outlines, handouts, and website links associated with classroom content. Fifty-eight percent used some sort of multimedia presentation (Avi, Quicktime®, mpeg, etc.); however, less than fifteen percent used 16mm films and filmstrips. (See Table 7)

Table 1. *Training Programs*

Training Programs Offered	Percentage of Respondents	Number of Respondents
Aviation Flight Training	97.06%	33
Aviation Management	85.29%	29
Aircraft Maintenance	26.47%	9
Other (Not Listed)	20.59%	7
Air Traffic Control	17.65%	6
Avionic Maintenance	14.71%	5
Human Factors/Safety	8.82%	3

Table 2. *Support Received in Utilization of Technology*

Support Received in Utilization of Technology					
	Excellent	Good	Average	Fair	Poor
University Administration	34.38% (11)	31.25% (10)	18.75% (6)	15.63% (5)	0%
Deans	43.75% (14)	21.88% (7)	18.75% (6)	15.63% (5)	0%
Chairs	53.13% (17)	25.00% (8)	12.50% (4)	6.25% (2)	3.13% (1)

(Number of respondents are indicated inside of the parenthesis.)

Table 3. *How Technology is Involved*

How Technology is Involved – Aircraft					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Technologically Advanced Aircraft Utilized	29.41% (10)	32.35% (11)	20.59% (7)	11.76% (4)	5.88% (2)
Performance Management System	12.90% (4)	12.90% (4)	38.71% (12)	22.58% (7)	12.90% (4)
Flight Management Systems	18.18% (6)	18.18% (6)	39.39% (13)	12.12% (4)	12.12% (4)
GPS / RNAV / Loran	50.00% (17)	35.29% (12)	8.82% (3)	2.94% (1)	2.94% (1)

(Number of respondents are indicated inside of the parenthesis.)

Table 4. *Classroom Aircraft Technology*

Classroom Aircraft Technology					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Talk About Aircraft Technology	68.75% (22)	31.25% (10)	0%	0%	0%
Demonstrate Aircraft Technology With Computer Programs	38.24% (13)	44.12% (15)	17.65% (6)	0%	0%
Do Not Talk About Aircraft Technology	0%	0%	6.67% (2)	26.67% (8)	66.67% (20)

(Number of respondents are indicated inside of the parenthesis.)

Table 5. *PC Based Technology*

PC Based Technology					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Classroom Installed Computers	63.64% (21)	15.15% (5)	12.12% (4)	9.09% (3)	0%
Classroom Installed VCR	75.00% (24)	15.63% (5)	6.25% (2)	3.13% (1)	0%
Classroom Installed DVD	75.76% (25)	18.18% (6)	3.03% (1)	3.03% (1)	0%
Classroom Installed LCD Type Projector	67.65% (23)	14.71% (5)	8.82% (3)	2.94% (1)	5.88% (2)
Portable LCD Type Projector	46.88% (15)	18.75% (6)	15.63% (5)	6.25% (2)	12.50% (4)
Multimedia Projection Booth in Classroom	30.30% (10)	24.24% (8)	18.18% (6)	9.09% (3)	18.18% (6)

(Number of respondents are indicated inside of the parenthesis.)

Table 6. *Software*

Software					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Utilized With Simulated Training Programs	61.76% (21)	23.53% (8)	14.71% (5)	0%	0%
Technical Systems Software Utilized	42.42% (14)	15.15% (5)	24.24% (8)	15.15% (5)	3.03% (1)

(Number of respondents are indicated inside of the parenthesis.)

Table 7. *Instructor Class Management Tools*

Instructor Class Management Tools					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
PowerPoint Presentations	82.35% (28)	11.76% (4)	2.94% (1)	2.94% (1)	0%
Blackboard / WebCT Utilization	51.52% (17)	24.24% (8)	12.12% (4)	6.06% (2)	6.06% (2)
Blackboard / WebCT Utilization for Online Quiz	41.18% (14)	20.59% (7)	20.59% (7)	11.76% (4)	5.88% (2)
Blackboard / WebCT Utilization for Online Assessment	35.29% (12)	23.53% (8)	23.53% (8)	8.82% (3)	8.82% (3)
Blackboard / WebCT Utilization of Syllabi	40.63% (13)	25.00% (8)	18.75% (6)	6.25% (2)	9.38% (3)
Blackboard / WebCT Utilization of Course Documents	41.18% (14)	26.47% (9)	17.65% (6)	5.88% (2)	8.82% (3)
Faculty Issued Computers / Laptops	58.82% (20)	14.71% (5)	14.71% (5)	8.82% (3)	2.94% (1)
Dry Erase Boards in Classrooms	65.63% (21)	18.75% (6)	0%	6.25% (2)	9.38% (3)
Smart Boards in Classrooms	12.90% (4)	16.13% (5)	22.58% (7)	22.58% (7)	25.81% (8)
Chalk Boards in Classrooms	20.59% (7)	20.59% (7)	23.53% (8)	17.65% (6)	17.65% (6)
Transparencies Utilized in Classroom Presentations	26.47% (9)	38.24% (13)	14.71% (5)	11.76% (4)	8.82% (3)
Videos Utilized in Classroom Instruction	64.71% (22)	29.41% (10)	5.88% (2)	0%	0%
DVDs Utilized in Classroom Instruction	67.65% (23)	23.53% (8)	8.82% (3)	0%	0%
16 mm Films Utilized in Classroom Instruction	6.06% (2)	3.03% (1)	15.15% (5)	36.36% (12)	39.39% (13)
Film Strips Utilized in Classroom Instruction	8.82% (3)	5.88% (2)	11.76% (4)	32.35% (11)	41.18% (14)
Avi, Quicktime, mpeg, etc. Utilized in Classroom Instruction	29.41% (10)	29.41% (10)	23.53% (8)	5.88% (2)	11.76% (4)

(Number of respondents are indicated inside of the parenthesis.)

Table 8. *Student Issued and Mandated Utilization of Laptops*

Student Issued and Mandated Utilization of Laptops					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Mandated Utilization in Classroom Setting	15.15% (5)	15.15% (5)	9.09% (3)	24.24% (8)	36.36% (12)
Student Computer Integrated into Instructor Work Station	3.13% (1)	12.50% (4)	21.88% (7)	15.63% (5)	46.88% (15)
CBT Programs Specifically for Host Institution	12.12% (4)	24.24% (8)	21.21% (7)	15.15% (5)	27.27% (9)

(Number of respondents are indicated inside of the parenthesis.)

UAA institutions responded to questions regarding student issued laptops. Twenty-four percent indicated required mandatory use in the classroom setting. Thirty-three percent indicated student laptop integration with the instructor workstation. Thirty-six percent responded that computer based training programs were specifically licensed to the host institution. (See Table 8)

Questions were asked to measure utilization of PCATDs within the training program. Thirty-seven percent indicated use of PCATDs in accordance with approved Training Course Outline (TCO) for students to log time. Seventy-six percent of the respondents indicated use of PCATDs for increasing skill proficiency. Twenty-two percent of respondents reported charging for PCATD use. (See Table 9)

Respondents answered questions regarding simulator and/or flight training device (FTD) usage. Seventy-eight percent used simulators and/or FTDs able to simulate both single and multi-engine operations. Thirty percent used type specific simulation equipment. Fifty-nine percent used generic visual display systems. Fifty-five percent indicated use of sophisticated visual displays in their simulators and/or FTDs. Sixty-one percent used visual displays during student evaluation. Eighty-four percent used the simulator and/or FTD to log time creditable for the approved TCO. Fifty-eight percent used simulators and/or FTDs for student improvement without logging time in the training syllabus; however, forty-six percent charged students for use of simulators and/or PCATDs for these skill mastery opportunities. Sixty-four percent had GPS units installed in the simulator and/or FTD; while forty percent had technically advanced aircraft representations in the simulator and/or FTD. (See Table 10)

The survey questioned respondents about incorporation of an approved TCO. Eighty-four percent incorporated the TCO into the training program with only one institution indicating no TCO incorporated. Forty-two percent conducted 14 Code of Federal Regulations (CFR) Part 61 training at the institution. Thirty-six percent indicated that the student was able to choose between a 14 CFR Part 61 and a 14 CFR Part 141 training syllabus. (See Table 11)

Table 9. *Personal computer Aviation Training Device*

Personal Computer Aviation Training Device (PCATD)					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Time Logged Toward Rating (TSO Approved)	29.41% (10)	8.82% (3)	14.71% (5)	23.53% (8)	23.53% (8)
Unlogged Student Skill Mastery Opportunities	38.24% (13)	38.24% (13)	8.82% (3)	5.88% (2)	8.82% (3)
Time on PCATD Charged	11.76% (4)	11.76% (4)	20.59% (7)	8.82% (3)	47.06% (16)
Time on PCATD Uncharged	35.29% (12)	26.47% (9)	14.71% (5)	11.76% (4)	11.76% (4)

(Number of respondents are indicated inside of the parenthesis.)

Table 10. *Simulator/Flight Training Device*

Simulator / Flight Training Device (FTD)					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Generic Simulator / FTD Utilized	52.94% (18)	26.47% (9)	8.82% (3)	5.88% (2)	5.88% (2)
Type Specific Simulator / FTD Utilized	15.15% (5)	15.15% (5)	24.24% (8)	15.15% (5)	30.30% (10)
Generic Visual Displays in Simulator / FTD	31.25% (10)	28.13% (9)	15.63% (5)	6.25% (2)	18.75% (6)
Sophisticated Visual Displays in Simulator / FTD	38.24% (13)	17.65% (6)	11.76% (4)	14.71% (5)	17.65% (6)
Visual Displays Utilized During Training Evaluation	26.47% (9)	35.29% (12)	11.76% (4)	11.76% (4)	14.71% (5)
Time Logged Toward Rating (TSO Approved)	61.76% (21)	23.53% (8)	5.88% (2)	2.94% (1)	5.88% (2)
Unlogged Student Skill Mastery Opportunities	23.53% (8)	35.29% (12)	17.65% (6)	8.82% (3)	14.71% (5)
Unlogged Student Skill Mastery Opportunities – Charged for Time	20.59% (7)	26.47% (9)	17.65% (6)	5.88% (2)	29.41% (10)
Unlogged Student Skill Mastery Opportunities – Not Charged	11.76% (4)	5.88% (2)	23.53% (8)	29.41% (10)	29.41% (10)
GPS Installed in Simulator / FTD	44.12% (15)	20.59% (7)	8.82% (3)	8.82% (3)	17.65% (6)
Technically Advanced Aircraft Represented in Simulator / FTD	17.65% (6)	23.53% (8)	20.59% (7)	17.65% (6)	20.59% (7)

(Number of respondents are indicated inside of the parenthesis.)

Table 11. *Training Course Outline*

Training Course Outline (TCO)					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Incorporated into Training Program	63.64% (21)	21.21% (7)	12.12% (4)	0%	3.03% (1)
Part 61 Training Utilized by Institution	15.15% (5)	27.27% (9)	12.12% (4)	15.15% (5)	30.30% (10)
Student Choice of Part 61 / 141 Training	15.15% (5)	21.21% (7)	9.09% (3)	18.18% (6)	36.36% (12)

(Number of respondents are indicated inside of the parenthesis.)

Federal Aviation Administration (FAA) written testing facilities were addressed within the survey. Sixty-eight percent indicated utilizing a Laser Grade testing facility. Twenty-four percent indicated using a Computerized Aviation Testing Service (CATS) testing facility. Only one institution indicated using an AVTEST testing facility. (See Table 12)

Questions were poised to determine commonality of aviation-related resources at UAA member institutions. Forty percent of respondents indicated having a remote library separate from the main university library, devoted to aviation resources. Fifty-seven percent attested that the aviation library consisted of generic aviation resource materials. Sixty-four percent expressed library contained material specific to aviation programs offered by the university. Among these holdings, ninety percent agreed with having aviation textbooks and reading materials available for students in addition to aviation periodicals. Ninety-three percent reported having aviation reference materials available in the library for student use.

Eighty-one percent reported having multimedia holdings available for student use. (See Table 13)

Departmental computer assets and utilization were also included within the study. Ninety percent of polled institutions agreed with allowing students use of departmental computer assets. Seventy-two percent provided a stand-alone computer system for student use while ninety-six percent reported having internet capable student computers. Only one institution indicated not having an internet capable student computer available. Seventy-five percent expressed having FAA written test bank questions installed on departmental computers. Over eighty percent of respondents had word processing, PowerPoint®, spreadsheet, and data base software installed on departmental computers; however, two institutions indicated not having the software installed. (See Table 14)

All respondents indicated using some sort of IBM or a derivative of an IBM computer. No departments indicated using Macintosh (Mac) computers or Linux operating systems. Although a Likert Scale was utilized in the answering of the questions for this section, the researchers agree that a "yes/no" format would be more accurate when performing any replication of this survey. (See Table 15)

Inquiries were made concerning use of preflight weather stations. Seventy-eight percent had a weather station with aviation weather products available for student use. Eighty-seven percent had a telephone available for use during a preflight briefing and ninety-six percent had a personal computer (PC) available for weather briefings prior to flight. Although a Likert Scale was utilized in the answering of the questions for this section, the researchers agree that a "yes/no" format would be more accurate when performing any replication of this survey. (See Table 16)

Weather reporting services were examined. Seventy-seven percent strongly agreed with having an Automated Surface Observing System (ASOS) or Automated Weather Observing System (AWOS) located on the airport where student training was performed while forty-nine percent indicated having some sort of National Oceanic and Atmospheric Association (NOAA) weather reporting facility. Although a Likert Scale was utilized in the answering of the questions for this section, the researchers agree that a "yes/no" format would be more accurate when performing any replication of this survey. (See Table 17)

Table 12. *Federal Aviation Administration Testing Facility*

Federal Aviation Administration Testing Facility					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lasergrade Testing Utilized	59.38% (19)	9.38% (3)	9.38% (3)	6.25% (2)	15.63% (5)
CATS Testing Utilized	21.88% (7)	3.13% (1)	21.88% (7)	6.25% (2)	46.88% (15)
AVTEST Testing Utilized	3.33% (1)	0%	26.67% (8)	13.33% (4)	56.67% (17)
Owned and Operated by the Aviation Department	56.25% (18)	6.25% (2)	15.63% (5)	6.25% (2)	15.63% (5)
Owned and Operated by University Testing Services	15.15% (5)	3.03% (1)	12.12% (4)	18.18% (6)	51.52% (17)
On Airport / University Property but Owned by Outside Entity	21.21% (7)	6.06% (2)	6.06% (2)	15.15% (5)	51.52% (17)

(Number of respondents are indicated inside of the parenthesis.)

Table 13. *Aviation Library*

Aviation Library					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Remote Library Separate from Main University Library Dedicated to Aviation	29.41% (10)	11.76% (4)	20.59% (7)	17.65% (6)	20.59% (7)
Generic to All Aviation	36.36% (12)	21.21% (7)	30.30% (10)	6.06% (2)	6.06% (2)
Program Specific Material (Flight, Maintenance, Management, etc.)	35.29% (12)	29.41% (10)	26.47% (9)	0%	8.82% (3)

(Number of respondents are indicated inside of the parenthesis)

Table 14. *Departmental Computer Assets*

Departmental Computer Assets					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Available for Student Use	72.73% (24)	18.18% (6)	0%	3.03% (1)	6.06% (2)
Stand Alone Student Computer System	51.52% (17)	21.21% (7)	9.09% (3)	3.03% (1)	15.15% (5)
Internet Capable Student Computers	84.85% (28)	12.12% (4)	0%	3.03% (1)	0%
FAA Written Test Bank Questions Installed	58.82% (20)	17.65% (6)	11.76% (4)	5.88% (2)	5.88% (2)
Word Processing Capable	82.35% (28)	8.82% (3)	2.94% (1)	2.94% (1)	2.94% (1)
PowerPoint Capable	85.29% (29)	11.76% (4)	0%	2.94% (1)	0%
Spreadsheet Capable	85.29% (29)	11.76% (4)	0%	2.94% (1)	0%
Database Capable	76.47% (26)	11.76% (4)	5.88% (2)	2.94% (1)	2.94% (1)

(Number of respondents are indicated inside of the parenthesis.)

Table 15. Type of Computers

Type of Computers in Department					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Macintosh	0%	0%	13.79% (4)	10.34% (3)	75.86% (22)
IBM or IBM Equivalent (Dell, Gateway, Hewlett Packard, etc.)	85.29% (29)	14.71% (5)	0%	0%	0%
Linux	0%	0%	10.34% (3)	20.69% (6)	68.97% (20)

(Number of respondents are indicated inside of the parenthesis.)

Table 16. *Aircraft Preflight Weather Station*

Aircraft Preflight Weather Station					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Generic Weather Station	12.12% (4)	12.12% (4)	18.18% (6)	15.15% (5)	42.42% (14)
Aviation Specific Weather Station	72.73% (24)	6.06% (2)	15.15% (5)	3.03% (1)	3.03% (1)
Phone Available for Preflight Briefing	81.82% (27)	6.06% (2)	9.09% (3)	0%	3.03% (1)
PC Available for Checking Weather (DUAT, Internet, etc.)	87.50% (28)	9.38% (3)	3.13% (1)	0%	0%

(Number of respondents are indicated inside of the parenthesis.)

Table 17. *On-Site Weather Reporting*

On-Site Weather Reporting					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
ASOS on Field	34.38% (11)	9.38% (3)	25.00% (8)	6.25% (2)	25.00% (8)
AWOS on Field	43.75% (14)	9.38% (3)	9.38% (3)	6.25% (2)	31.25% (10)
NOAA Weather Reporting Capabilities	37.50% (12)	12.50% (4)	18.75% (6)	9.38% (3)	21.88% (7)

(Number of respondents are indicated inside of the parenthesis.)

Table 18. *Aircraft Scheduling*

Aircraft Scheduling					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Individuals Employed to Schedule / Dispatch Aircraft	72.73% (24)	12.12% (4)	9.09% (3)	3.03% (1)	3.03% (1)
No Individual Employed to Schedule / Dispatch Aircraft	6.06% (2)	3.03% (1)	15.15% (5)	12.12% (4)	63.64% (21)
Aircraft Scheduled Using Paper Log	26.47% (9)	14.71% (5)	11.76% (4)	8.82% (3)	38.24% (13)
Aircraft Scheduled Using Computer(s)	54.55% (18)	18.18% (6)	12.12% (4)	3.03% (1)	12.12% (4)
Aircraft Schedule Available on Internet	42.42% (14)	9.09% (3)	18.18% (6)	9.09% (3)	21.21% (7)

(Number of respondents are indicated inside of the parenthesis.)

Respondents were questioned in regards to aircraft scheduling. Eighty-four percent indicated that a specific individual(s) was employed to schedule and/or dispatch training aircraft. Seventy-two percent used a computer to schedule training flights while only forty percent of the institutions utilized a paper log to schedule training aircraft. Fifty-one percent provided access to the training schedule via the internet. Although a Likert Scale was utilized in the answering of the questions for this section, the researchers agree that a "yes/no" format would be more accurate when performing any replication of this survey. (See Table 18)

Respondents were asked how they viewed the importance of technology within their training program. All respondents indicated that technology was important in the classroom as well as in the aircraft. The majority of respondents indicated that technology was important in support of the department; however, one institution replied it was of less

importance. The majority of institutions stated technology used in student support was important. (See Table 19)

Respondents were asked questions concerning future technology purchases. Eighty-one percent employed technology enhanced aids during student classroom instruction. Seventy-two percent utilized technology aids for the department. Sixty-two percent used technology-enhanced aids for student training. Twenty-eight percent utilized technically advanced aircraft in their programs. While forty-six percent indicated plans to purchase technically advanced aircraft, only forty-four percent used upgraded avionics. Thirty-eight percent planned to purchase upgraded avionics. Seventy-two percent used GPS or RNAV systems within their respective program. (See Table 20)

CONCLUSIONS

With over 800 members, the UAA has established itself as a nationally recognized leader among collegiate aviation institutions. The analyzed data in this study reflected UAA member institutions use of current technology.

Modern computer access was common within the classroom settings. Over seventy-five percent of UAA institutions utilized advanced computer technology including PowerPoint® Presentations, classroom installed computers, aircraft programs, simulated training software, and use of Blackboard® or WebCT®. In addition, computers were used by over half of the institutions to schedule aircraft and allow the schedule to be viewed on the internet. All UAA institutions polled indicated aircraft technology discussions within the classroom setting.

One of the most important statistics within this survey focused on use of technically advanced aircraft. Sixty one percent of the UAA institutions polled utilized technically advanced aircraft during the training of the students. These aircraft are equipped with the most modern avionics available on the market today.

Data presented by this study suggests that UAA member institutions keep up with current technology. The majority of UAA respondents felt that technology is very important in the classroom, aircraft, and department/student support system. This study demonstrated that UAA member institutions continue that leadership today within the technological realm by remaining on the forefront of technology innovations.

Table 19. *Importance of Technology*

Importance of Technology			
	Very Important	Important	Of Less Importance
Technology in the Classroom	88.24% (30)	11.76% (4)	0%
Technology in the Aircraft	81.82% (27)	18.18% (6)	0%
Technology Used in Supporting the Department	82.35% (28)	14.71% (5)	2.94% (1)
Technology Used in Student Support	76.74% (26)	17.65% (6)	5.88% (2)

(Number of respondents are indicated inside of the parenthesis.)

Table 20. *Future Technology Purchases*

Future Technology Purchases			
	Use	Plan to Buy	No Plans to Buy
Technology Aids in Classrooms	81.82% (27)	12.12% (4)	6.06% (2)
Technology Aids for Department	72.73% (24)	21.21% (7)	6.06% (2)
Technology Aids for Students	62.50% (20)	15.63% (5)	21.88% (7)
Technically Advanced Aircraft	28.13% (9)	46.88% (15)	25.00% (8)
Upgraded Avionics	44.12% (15)	38.24% (13)	17.65% (6)
GPS / RNAV Systems	72.73% (24)	15.15% (5)	12.12% (4)

(Number of respondents are indicated inside of the parenthesis.)

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APPENDIX

SURVEY

For each of the statements below, please indicate the extent of your agreement or disagreement by placing an X in the appropriate Column regarding your departmental utilization with technology

1. **Institution Classification**
   - 2 Year Program
   - 4 Year Program

2. **Select the Training Programs Offered by Your Institution**
   - Aviation Management
   - Aviation Flight Training
   - Avionic Maintenance
   - Aircraft Maintenance (Airframe and/or Powerplant)
   - Air Traffic Control
   - Human Factors / Safety
   - Other _____

3. **Support You Receive in Utilization of Technology**

University Administration	Excellent
Deans	Good
Chair	Average
	Fair
	Poor

4. **How is Technology Involved - Aircraft**

Technologically Advanced Aircraft Utilized	Strongly Agree
Performance Management System	Agree
Flight Management Systems	Neutral
GPS/RNAV/Loran/Etc	Disagree
	Strongly Disagree

5. **Classroom Aircraft Technology**

Talk About Aircraft Technology	Strongly Agree
Demonstrate Aircraft Technology With Computer	Agree
Programs	Neutral
Do Not Talk About Aircraft Technology	Disagree
	Strongly Disagree

6. **PC Based Instruction**

Classroom Installed Computers	Strongly Agree
Classroom Installed VCR	Agree
Classroom Installed DVD	Neutral
Classroom Installed LCD Type Projector	Disagree
Portable LCD Type Projector	Strongly Disagree
Multimedia Projection Booth in Classroom	

7. **Software**

Utilized With Simulated Training Programs (Microsoft	Strongly Agree
Flightsim, Elite, Sim Charts, Etc.)	Agree
Technical Systems Software (Vector Aircraft Systems,	Neutral
Aircraft Systems CBT Training, Etc.)	Disagree
	Strongly Disagree

8. **Instructor Class Management Tools**

PowerPoint Presentations	Strongly Agree
Blackboard/Webct Utilization	Agree
Blackboard/Webct Utilization for Online Quiz	Neutral
Blackboard/WebTV Utilization for Online Assessment	Disagree
Blackboard/WebTV Utilization of Syllabi	Strongly Disagree
Blackboard/WebTV Utilization of Course Documents (Lecture Outlines, Handouts, Course Links, etc.)	
Faculty Issued Computers/Laptops	
Dry Erase Boards in Classroom	
Smart Boards in Classroom	
Chalk Boards in Classroom	
Transparencies Utilized in Classroom Presentations	
Videos Utilized in Classroom Instruction	
DVD Utilized in Classroom Instruction	
16mm Films Utilized in Classroom Instruction	
Film Strips Utilized in Classroom Instruction	
Avi, Quicktime, mpeg, etc. Presentations Utilized in Classroom Instruction	

9. **Student Issued and Mandated Utilization of Laptops**

Mandatory Utilization in Classroom Settings (Notes, PowerPoints, Exam, Etc.)	Strongly Agree
Student Computer Integrated into Instructor Work Station	Agree
Computer Based Training Programs Specifically for Host Institution	Neutral
	Disagree
	Strongly Disagree

10. **PCATD**

Time Logged Per FAR Toward Rating (TCO Syllabus Approved)	Strongly Agree
Unlogged Student Skill Mastery Opportunities	Agree
Time on PCATD Charged	Neutral
Time on PCATD Uncharged	Disagree
	Strongly Disagree

11. **Simulator / FTD**

Generic Simulator/FTD Utilized (Capable of Simulating Multiple Aircraft Either Single or Multi Engine)	Strongly Agree
Type Specific Simulator/FTD Utilized	Agree
Generic Visual Displays in Simulator/FTD	Neutral
Sophisticated Visual Displays in Simulator/FTD	Disagree
Visual Displays Utilized During Training Evaluation	Strongly Disagree
Time Logged per FAR Toward Rating (TCO Syllabus Approved)	
Opportunity for Unlogged Student Skill Mastery Opportunity	
Unlogged Skill Mastery Opportunity Charged for Time Utilized	
Unlogged Skill Mastery Opportunity Not Charged for Time Utilized	
GPS Installed in Simulator/FTD	
Technically Advanced Aircraft Representation in Simulator/FTD	

12. **TCO**

Incorporated into Training Program	Strongly Agree
Part 61 Training Utilized by Institution	Agree
Student Choice Part 141/61 Training Syllabus	Neutral
	Disagree
	Strongly Disagree

13. **FAA Testing Facility**

Lasergrade Testing Utilized	Strongly Agree
Cats Testing Utilized	Agree
Avtest Testing Utilized	Neutral
Owned and Operated by Aviation Department	Disagree
Owned and Operated by University Testing Services	Strongly Disagree
On Airport / University Property but Owned by Outside Entity	

14. **Aviation Library**

Remote Library Separate from Main University Library	Strongly Agree
Dedicated to Aviation	Agree
Generic to All Aviation	Neutral
Program Specific Material (Flight, Maintenance, Management, Etc.)	Disagree
	Strongly Disagree

15. **Aviation Library Holdings**

Aviation Textbooks, Reading Books on Shelf	Strongly Agree
Aviation Periodicals on Shelf	Agree
Aviation Reference Material on Shelf	Neutral
Multimedia Holdings (VHS, DVD, 16 MM Films, Etc)	Disagree
	Strongly Disagree

16. **Departmental Computer Assets**

Available for Student Use	Strongly Agree
Stand Alone Student Computer System	Agree
Internet Capable Student Computers	Neutral
FAA Written Test Bank Questions Installed	Disagree
Word Processing Capable	Strongly Disagree
PowerPoint Capable	
Spreadsheet Capable	
Database Capable	

17. **Type of Computers in Department**

MAC	Strongly Agree
IBM or IBM Equivalent (Hewlett Packard, Compaq, Dell, Etc)	Agree
	Neutral
Lunix	Disagree
	Strongly Disagree

18. **Aircraft Preflight Weather Station**

Generic Weather Station	Strongly Agree
Aviation Specific Weather Station	Agree
Phone Available for Preflight Briefing	Neutral
PC Available for Checking Weather (DUAT, Internet, Etc.)	Disagree
	Strongly Disagree

19. **On Site Weather Reporting**

ASOS on Field	Strongly Agree
AWOS on Field	Agree
NOAA Weather Reporting Capabilities	Neutral
	Disagree
	Strongly Disagree

20. **Aircraft Scheduling**

Specific Individual(s) Employed to Schedule/Dispatch Aircraft	Strongly Agree
	Agree
No Specific Individual(s) Employed to Schedule/Dispatch Aircraft	Neutral
	Disagree
Aircraft Scheduled Using Paper Log	Strongly Disagree
Aircraft Scheduled Using Computer(s)	
Aircraft Schedule Availible on Internet	

21. **Importance of Technology**

Technology in the Classroom	Very Important
Technology in the Aircraft	Important
Technology Used in Supporting the Department	Of Less Importance
Technology Used in Student Support	

22. **Future Technology Purchases**

Technology Aids in Classroom	Use
Technology Aids for Department	Plan To Buy
Technology Aids for Students	No Plans To Buy
Technically Advanced Aircraft	
Upgraded Avionics	
GPS / RNAV Systems	