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Assessing the Impact of Implemented Safety Culture Recommendations in a Collegiate-Level Flight Training Program

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The purpose of this research is to report on the effectiveness of implementing the recommendations that were the outcome of the previously completed research involving the identification of best practices to improve overall safety performance and safety culture within Utah Valley University's flight training operations. Prior to the safety culture research that was conducted in 2022, UVU observed an underreporting of safety issues within flight and maintenance operations. There was concern that an insufficient understanding existed related to the impact that safety culture has on safety performance. A survey was conducted across all flight and aircraft maintenance functions and the collected data was analyzed to determine trends and opportunities for implementing related to the safety culture that existed at the time. Through 2023, recommendations were prioritized and implemented through all flight and maintenance departments. In 2024, another survey was conducted to once again collect data to determine if the implemented recommendations achieved the desired positive change in safety culture, safety performance, and risk mitigation. The research report identifies and describes the effectiveness of the implemented action plan to improve safety performance through an effective and integrated safety culture. Lessons learned and best practices will be shared to allow other schools to develop and engage an effective safety culture of their own within their flight training programs.

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Safety Culture in Collegiate Aviation – 2024 Update

Why Research Safety Culture?

In 2022 UVU conducted research on safety culture within a collegiate aviation program. The research was conducted in response to several safety concerns in UVU flight department, specifically within the maintenance and flight operations area. Observations made by UVU's safety coordinator determined that safety issues were being underreported in UVU's safety reporting platform, Aviation Information Management Systems (AIMS). The AIMS safety reports were not representative of what was being observed in the flight department and at times reflected repeat occurrences of simple mistakes. Another concern was that not all safety related aircraft discrepancies were being captured by the safety reports resulting in a missed opportunity to discuss safety concerns across departments. Furthermore, the safety reporting system was inappropriately being used to report tension between departments. Grievances by individuals that were not getting along and communicating within the organizations were being reported through the safety reporting systems. It was determined through these reports that interdepartmental relationships and communication between flight operations and maintenance were not healthy. These observations led UVU to conclude that the lack of safety culture and a poor safety reporting culture can impact overall performance (Silcox, Ley, & Sutliff, 2022).

Research Goal

The goal of our research and the safety culture survey in 2022 was to identify how safety culture can impact safety performance in flight operations and identify actions to mitigate safety concerns and improve overall performance in the flight department. In addition to the distribution of a safety culture survey, research was conducted on safety culture initiatives in high-risk organizations outside aviation, a search of the ASRS data base on safety culture related accidents and looked at the implementation of aviation industry wide safety initiatives. At the conclusion of the 2022 research study and survey we identified the following priorities to improve the safety culture and performance in UVU's aviation program: "1) Interdepartmental Relationships, 2) Communication between Departments, 3) Quality of Flight Instruction, 4) Employee and Safety Training, and 5) Professionalism among Employees" (Silcox, Ley, & Sutliff, 2022). Recommendations were identified for each priority and were implemented throughout academic years 2022-2024.

Research Methodology

The UVU School of Aviation Sciences conducted a survey the Summer 2022 to determine the impact organizational culture and departmental relationships have on operational safety within the UVU School of Aviation Sciences Flight Department. The same survey was conducted a second time during the early Summer of 2024. The results of each were compared to determine if the recommendations implemented between 2022 to 2024 were effective or impactful to the goals of the Safety Culture program. The research surveys 2022 and 2024 included populations from the same functional roles that were involved in flight training operations within the School of Aviation Sciences at Utah Valley University. These roles included Flight Instruction, Staff within Records, Scheduling, and Dispatch Services, Flight

Students, Aircraft Maintenance, and Flight Line Services. The research survey received UVU Institutional Review Board (IRB) approval (No.1105) and was conducted through an online hybrid quantitative and qualitative survey using Qualtrics as a data collection tool.

Comparing 2024 Survey Responses to 2022 Survey – Has the Needle Moved?

For consistency to the 2022 survey analysis, this section will follow the same simple inclusion of the survey question, data, and brief analysis commentary on the observations made by the researchers and only to those survey questions determined to be significant to the study and actionable by the UVU Flight Department. As a result, some survey questions utilized in the 2022 survey report are not included in the 2024 report.

Survey Population: The 2024 survey resulted in 63 respondents, which is 49% of the 2022 population of 129 respondents. Decline in participation is likely due to the removal of participation incentives during the 2024 survey. The percentage of population within roles participating in the survey is closely matched between 2022 and 2024 with more respondents from Flight Instruction in 2024, 39%, compared to 2022, 25.6%. and a reduction in Flight Student respondents in 2024, 39%, compared to 2022 at 51.1%. The 2024 distribution of the remaining respondents' roles are consistent with the relative size of the population of roles within the flight department.

Question - *Relationships and trust amongst functional groups within the flight department, either positive or negative, can impact safety to flight operations. To what level do you agree or disagree with this statement?*

2024 survey results indicated 91% of respondents feel relationships and trust can impact safety. This is down 3% from the 2022 survey that was quantified at 94%. The researchers' impression is that the decrease is not an actionable opportunity. Overall, the flight department continues to feel that relationships and trust are important and can impact flight safety. There is a suggestion from the research team that the decrease could indicate that relationships and trust is not as much of a focal point in 2024 as it was in 2022. Could this mean that implemented programs are resulting in less tension within the functional groups? An interesting observation of data within this question indicated that the response 'Neither agree nor disagree' went from 2% in 2022 to 7% in 2024 which cannot be explained adequately by the research team. Too many assumptions would be required without direct commentary being provided by the respondents.

According to Silcox, Ley, and Sutliff (2022), "...the elements that make up an organizational culture, relationships, and trust, are viewed as impactful to safe flight operations. This is a critical finding. The reverse of this, a discordant organizational culture with fractured or no relationships nor trust within or between groups can negatively impact safety within the department." The researchers continued to find this true 2 years later. Anecdotal observations within the day-to-day flight operations confirm this as well. It is essential that safety culture continue to be imbedded within flight operations to ensure positive relationships within the different flight department roles results in positive safety outcomes.

Question – For the focus area listed, rate the effectiveness of each within the UVU flight department.

As in the 2022 survey, the 2024 survey respondents were given 16 functional categories in which they were to rate the level of perceived effectiveness. An average score for each category was calculated and then plotted using a graph (Ref. Figure 1 and Figure 2). Note, Figure 1 does not include the average scores in the graphed data as the Qualtrics software version changed between 2022 to 2024 resulting in different graphic choices and characteristics.

Table 1
Focus Areas, Most Effective and Opportunities for Improvement

2022 Survey		2024 Survey	
Most Effective	Opportunities-Improvement	Most Effective	Opportunities-Improvement
*Operational condition of aircraft	*Interdepartmental relationships	*Operational condition of aircraft	*Communication b/w departments
*Maintenance of aircraft	*Communication b/w departments	*Maintenance of aircraft	*Interdepartmental relationships
*Line operational safety	*Employee training	Addressing safety concerns	*Employee training
		*Line operational safety	Dispatch & scheduling of aircraft
		Safety culture	

* Topics repeated between 2022 and 2024 survey results

Reference Table 1. The 2024 survey resulted in a repeat of the top 3 most effective functional categories, Operational Condition of the Aircraft, Maintenance of the Aircraft, and Line Operational Safety. In the 2024 survey, notice ‘Safety Culture’ and ‘Addressing Safety Concerns’ have both landed in the top 3 of most effective functional categories each achieving the same score of 2.7, reference Figure 1. The top 3 opportunities for improvement in both the 2022 and 2024 survey were related to characteristics assigned to organizational behavior. For the context of this paper, the researchers attribute this behavior to safety culture as was previously identified in the 2022 paper (Silcox, Ley, & Sutliff, 2022).

Figure 1
Rating of Effectiveness (2022)

Rating of Effectiveness

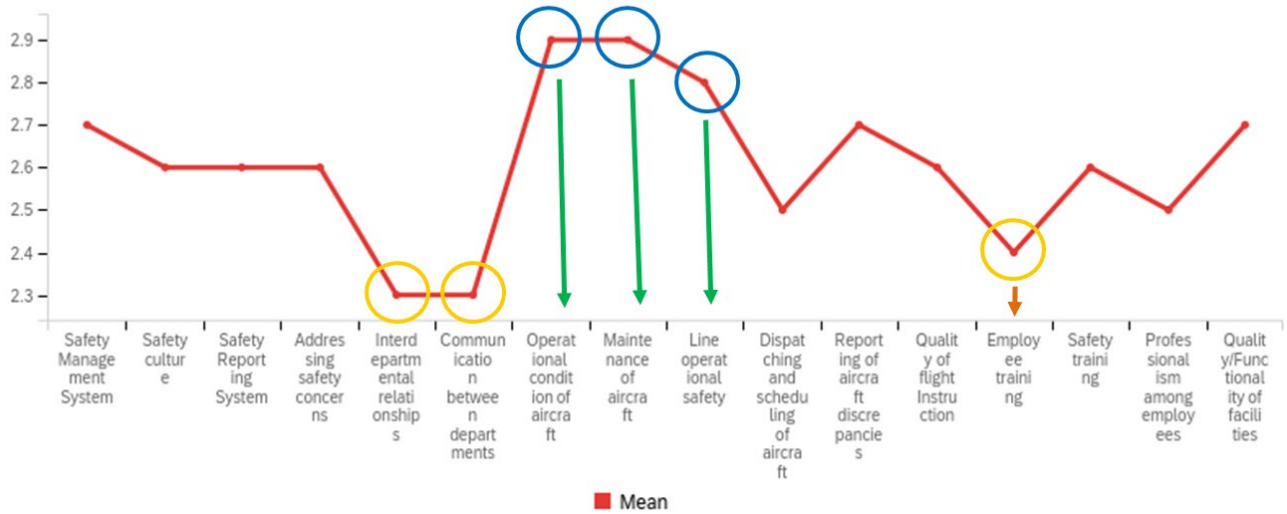
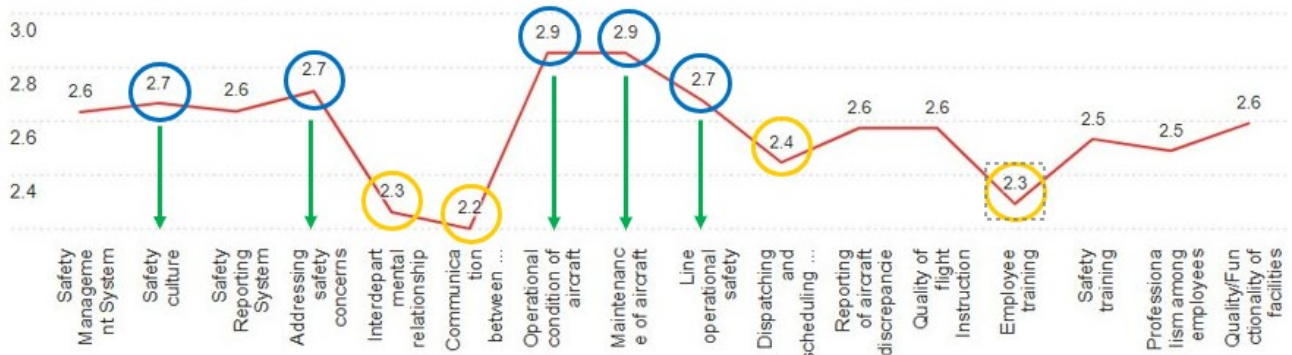


Figure 2
Rating of Effectiveness (2024)

Rating of Effectiveness



Question – For the focus areas listed, what are the top 3 focus areas that you feel has the greatest impact on achieving an effective safety program at UVU Flight?

Reference Table 2. A clear pattern exists in respondents’ priorities in identifying what the top three focus areas are that have the greatest impact on achieving an effective safety program. Safety culture and quality of flight instruction recur between the 2022 and 2024 surveys and also in the same order of priority. Safety culture leads in priority with quality of flight instruction following. The data infers that the flight department must remain vigilant to these perceptions and ensure the safety program aligns with the expectations of all roles within the department and that policy and process must ensure the safety goals are achieved.

In the 2024 survey, communication between departments was added to the top 3 focus areas while maintenance of aircraft dropped out of the list. In fact, maintenance of aircraft dropped significantly down in the list of respondents expressed priorities. The researchers’ opinions of this drop in priority are not concerning and may indicate the level of confidence the flight department has in the quality and flight readiness of the aircraft. Communication between departments is not a new subject of concern within the flight department and the survey results from this question bring greater attention and priority to finding solutions to address this topic.

Table 2
Top 3 focus areas having greatest impact on effective safety program

2022 Survey	2024 Survey
*Safety Culture	*Safety Culture
*Quality of Flight Instruction	*Quality of Flight Instruction
Maintenance of Aircraft	Communication Between Departments

* Topics repeated between 2022 and 2024 survey results

Question - *How would you grade the current safety program within UVU Flight Operations?*

In 2022, 89% of respondents scored the safety program at B or better. The 2024 response indicated a 3% improvement from 2022 measuring at 92% of respondents rating the current safety program at a grade of B or better. Overall, the researchers consider this to be a general high level of confidence in the flight department’s safety program between both surveys. Also, the implemented initiatives from 2022 to 2024 had a positive impact.

Optional (Open) Questions – Two optional questions were asked within the 2022 and 2024 surveys that required the respondent to provide a free form written comment/response. The two questions included:

- 1) Do you feel the safety procedures and policies are effectively communicated, accessible, and utilized within the UVU flight department for your role?
- 2) What steps can be taken to improve the safety culture or safety effectiveness within the UVU Flight Department? Are there any areas of concern that you would like to have addressed?

The researchers carefully reviewed and grouped each written comment into at least one or multiple categories. All researchers were in consensus as to the category or common subject assignment of each comment. The same 16 common subjects in 2022 were used in 2024 to ensure an effective comparison between the two data sets. There were a minor number of comments that did not adequately align within the identified 16 categories; however, they were identified but excluded from the data set. The excluded comments were considered ‘unactionable’ for the purpose of the survey. In some cases, ‘positive comments’ were given in which the researchers felt it was important not to lose these important data points and were added to a separate, new category in the 2024 analysis. In the 2022 survey, there were a total of 73 usable written comments and 36 generated by respondents in 2024. A frequency count of each category was generated in a table in which the top 80% of the total comments were used for analysis in this report.

Below are the frequency results of the top 80% of the most commented subjects (Table 3).

Table 3
Subject topics most frequently commented

2022 Survey		2024 Survey	
Category/Topic	Frequency	Category/Topic	Frequency
Safety Culture	21	Interdepartmental Relationships	10*
Safety Training	20*	Positive Comments	10
Professionalism	19*	Employee Training	9
Interdepartmental Relationships	15*	Professionalism	9*
Communication b/w Depts	15*	Safety Training	7*
Quality of Flight Instruction	14	Communication b/w Depts	7*
		Quality of Flight Instruction	6

* Topics repeated between 2022 and 2024 survey results

Reference Table 3. The 2024 survey resulted in six categories of comments having an equal number of responses and were included in the analysis and weighted equally within the topic pairs. The following topics were repeated between the 2022 and 2024 surveys, Safety Training, Professionalism, Interdepartmental Relationships, and Communication Between Departments. In 2024, the category ‘Safety Culture’ dropped below the 80% threshold while ‘Employee Training’ was elevated to above the 80% threshold and was added to the list of most frequently mentioned topics within the open comments provided in the two questions. The researchers believe ‘Safety Culture’ dropping out of the top 80% of most frequently mentioned topics within the open questions could be an indicator that this is not a hot button topic of concern within the flight department. The category ‘Interdepartmental Relationships’ elevated to one of the most frequently commented topics within the 2024 survey and is an area of concern to the researchers indicating that this is an important topic to address and aligns with its importance indicated in previous questions.

There was a quantifiable number of positive comments within the 2024 study that were assigned a new category ‘Positive’ that reached well above the 80% threshold. This is considered to be a very important indicator, unsolicited, that the implemented improvements from the 2022 study recommendations have taken root and have added value to improving overall safety culture within the flight department.

What Worked, and What can be Improved

The 2024 survey revealed that many of the safety initiatives implemented following the 2022 survey resulted in a more robust safety culture. Through increased student and employee training both in person and online, the perception of the effectiveness of UVU’s safety program rose by three percent. Our CFI safety stand downs now occur twice annually and include training events on aircraft inspections, pre and post flight procedures, and aircraft systems operation led by our maintenance technicians. Annual online training on our Safety Management System (SMS) and Emergency Response Plan (ERP) was embedded into the university’s Learning

Management Systems (LMS) for both students and employees. Other reasons for the improved perceptions are increased access to the safety reporting system for sharing concerns and/or suggestions and an active and well received open-door policy with our dedicated aviation safety officer. Specific survey results indicating the effectiveness of the above initiatives include “operational condition” and “maintenance of aircraft” no longer being focus areas within our safety program. While “safety culture” continues to be an area with greatest impact on safety, it is no longer a focus area according to written comments received.

Recommended Next Steps

Opportunities for improvement remain. Concerns regarding “interdepartmental relationships” and “communication between departments” carried over from the 2022 survey as did “employee training.” A new area for improvement for 2024 was “dispatching and scheduling of aircraft.” To address these concerns, we plan more active interaction between maintenance, flight operations and dispatch personnel and a quick reference guide on policies, procedures, and expectations along with universal training on each within all departments. We are planning team building exercises independent of work-related duties to increase goodwill between departments. Meetings that include all functional areas to address concerns, safety culture, etc. will be conducted each semester.

Further improvement is needed in “quality of instruction” and “professionalism.” Both will be addressed by more active supervision of CFIs by assistant chief instructors. Since looking professional is a step toward acting professionally, a new uniform policy is now in effect and the assistant chiefs are leading by example. Professionalism training has been added to all monthly CFI meetings. From a student perspective, each student has been assigned an assistant chief as their flight advisor. Professionalism also applies to students and training in this area will be included as a component of classroom instruction, added to course objectives and integrated into assignments. We are considering a uniform policy for students.

Key Observations

A key takeaway from the 2024 survey is that students and employees welcome more safety training. We can provide written or electronic manuals and training programs. We can schedule more mandatory meetings in which safety is discussed. And we will do both, but maybe what’s also needed is a safety training culture shift. Every interaction, whether formal or informal, with a student or other employee is an opportunity for transfer of knowledge. What if you ended every conversation with “can you tell me something about safety of flight that I don’t already know,” or “may I ask you about a safety concept that I don’t fully understand?” You would not only look forward to learning each time, but you would always have to be ready with something important to share when one of those questions is asked of you.

Conclusion – Safety Improvement Will Never Stop

The purpose of this research is to identify cultural influences within the organization that impact safety and to find ways to create and maintain a positive safety culture. We have had some success with both as outlined in this publication.

In the latest survey, unsolicited positive comments regarding UVU's safety culture increased. While this is encouraging, it doesn't mean the job is done. It is merely an indication that what we are doing is making a difference. It's upon us to continue finding innovative ways to enhance safety in all areas of the organization.

We will continue with the actions that have been identified as effective and may conduct further surveys to quantify results and point out areas that need more attention. Additional research could be undertaken to identify the role of strategic hiring and timely termination in an organization's safety culture.

References

Silcox, F., Ley, S., & Sutliff, D. (2022). Organizational Culture Impact on Safety Within a Collegiate-Level flight Training Program. *Collegiate Aviation Review International*, 206-208.