Computers on Wheels (COWs) – Mobile Technology on the Shop Floor
Project Implementation Summary and Findings

Background:

The Computer on Wheels (COWs) initiative under the Air WA grant allowed for the design and purchase of mobile solutions to allow access to informational software and technical resources in real time. The intent was to better model the work environment of Aircraft Maintenance Technicians on the job. Through COWs, students have access to course materials and aircraft manuals that are updated in real time rather than traditional hard copy formats that become dated and costly to replace. Students also learn how to document work processes closely modeling real world practice (as many airlines are going paperless). COWs can also provide students easy access to other education software designed to enrich learning in real time (e.g. CANVAS, WordWeb, and videos online).

Intervention Design:

To address concerns about access to information and technology on the shop floor, partnering Air WA colleges adopted a number of different strategies. In general, COWs were purchased in one of the following four formats:

- **Tablet:** Cordless hand held option – touch screen and mobile
- **Laptop:** Cordless mobility but also appropriate for surface usage
- **PC on Cart:** Less mobility, but added security, ergonomics and storage capacity
- **Shop based PC Lab:** No mobility, but allows convenient access at the same time offers alternative usage of computers (lab based instruction)

Campus partners weighed a number of factors in choosing the appropriate technology for their AMT programs. Each campus inventoried the technology needs of their program and prioritized features in response to available grant resources (budget). The following features were noted by program participants as the major factors in choosing one COW option over another:

Maneuverability: The basic premise of a COW is that it be portable (or at the very least accessible) for ease of reference or documentation. Depending on design, COWs become either more or less maneuverable. Tablets and laptops are great for portability, but can be logistically challenging when alternating between hands on tasks (where do you dock the station, keyboard, etc..). The PC on a cart design, while more cumbersome in terms of size, allows student to more seamlessly alternate between shop tasks and computer work. Maneuverability is a factor of greatest concern when students are operating in small spaces.

Hardware Security and Storage: Program partners also considered storage as a factor for selection. Particularly for hand-held devices, where will they be safely stored and who will have access to the devices. Colleges like Spokane Community College developed a check out procedure (sample form attached) for students to check out and check in tablets. Computers are managed under the same policies and procedures governing tool checkout. By comparison, the PCs on carts were larger and harder to steal.

Software Security and Maintenance: Many partners cited IT infrastructure as a major factor in COW implementation. Concerns over web connectivity (for web based software and resources), software licenses, anti-virus software, and maintenance scheduling. How to manage technology that is sometimes in a hanger off of main campus, etc…

Ergonomics: The PCs on carts tend to offer a more ergonomic solution for students using computers repetitively or for long periods of time. Program partners weighed concerns regarding where to place tablets and laptops, availability of surfaces to place the device, and appropriate surface height, etc… The availability of a full size keyboard for record keeping also factors in. These makeshift arrangements may not be ideal for long periods of time. Some campuses invested in carts on wheels that serve as mobile platforms for mobile technology.

Battery Life: Battery life and access to power supply becomes a major consideration depending on class length or the number of consecutive classes in which technology will be used. How long do devices need to charge? What is the battery life in total? Are there sufficient electrical outlets to charge devices while in use? Are there supplementary battery packs that can be purchased to extend battery life?

Software: COWs were loaded with curriculum software, aircraft manuals, the Aviation WordWeb product, FAA circulars, and additional web-based resources assuming wireless internet was available. Software is limited by storage capacity of the device, access to the internet, and the availability of other basic software packages like Microsoft Office. Many colleges integrated the state's online learning management system (CANVAS) into lab time using the COWs.

Price Point: COW design was also heavily based on available financial resources. Hardware alone is more economical than purchasing hardware with the full cart (example for a fully outfitted cart depicted in the picture above). Utilization also becomes a factor, will the technology investment be leveraged sufficiently to warrant the expense? Would an adjacent lab offer much of the same flexibility but more optimal utility in terms of instruction?

In summary, the colleges opted for diverse strategies in purchasing and implanting the use of COWs. Overall the feedback has been positive. Instructors point out that the use of technology during lab is a more authentic reflection of the modern day work place. Students are advancing their computer skills, at the same time enriching their learning. The technical logistics associated with design and implementations range from mildly complex to highly complex (depending on IT infrastructure, facilities, policies, etc...), but everyone seems to agree that the investment is worth the return in terms of improved student outcomes. Overall this project was a success.

Online Resources:

http://www.faa.gov/

http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=ac027c002fb1ff296e7ea40b7622669a&rgn=div5&view=text&node=14:3.0.1.2.20&idno=14#14:3.0.1.2.20.3.3.12.61

https://www.schooloutfitters.com/resource/images/v20140820/earthwalk/ewk-5158.jpg

http://www.ofconcepts.com/ESI-Computer-Cart-p/esiwow.htm

http://www.cygnusinc.net/products/hiprodigy_howard_powered_cart.html

Spokane Community College
Aviation Maintenance Department
LAPTOP LOAN AGREEMENT

Date: _____ **SID#** _____

Students must present a current SCC identification card.
Laptop will not be checked out without proper ID.

Laptop and/or Accessories (please list on blank lines below; be specific):

_____

_____

_____

In exchange for the use of the [Name, i.e. Microsoft Surface or whatever] laptop and/or all accessories listed above, I agree to the following terms and conditions:

(Please initial the blank line to the left of each agreement.)

_____ By signing this form, the borrower assumes full responsibility and financial liability for the laptop and/or all accessories issued through this loan service from the date they are borrowed until returned in good order.

_____ Borrower agrees to pay the Aviation Maintenance Department of Spokane Community College for any damage to the laptop and/or all accessories borrowed. Failure to return the laptop and/or accessories will result in a replacement charge for all missing items.

_____ Return laptop and/or all accessories to the Instructional Tech in the Aviation Maintenance Department. The equipment will be inspected for physical damage and/or missing accessories at the time of return.

_____ Late returns will result in the suspension of laptop and/or accessories borrowing privileges for the remainder of the quarter and fines of $XX per day, in addition to withholding of completion certificates, if applicable (can we do this??)

Please initial ONLY ONE of the following statements:

_____ The borrower has inspected the laptop and/or accessories for physical damage and finds them in good condition.

_____ The borrower wishes to note and be released from liability for the following existing physical defects in the laptop and/or accessories:

_____

Instructional Tech agrees with above-noted defects (initials): _____

Borrower's Name: (print) _____

Borrower's Signature: _____

Email Address: _____

Phone: _____ Cell (if different): _____