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Implementation Paper

Methods for an effective "increased hands-on activities" approach in my classroom

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## **INTRODUCTION**

### **Purpose and Methodology**

The purpose of this research is to find methods to implement an effective "increased hands-on activities" approach in my classroom. The need for this arose from student feedback on my student evaluation forms, pleading for more hands-on activities in lecture and lab. Also, because of seemingly conflicting specifications from my administration regarding educational training systems, I designed my Affordable Hands-On Trainer (AHOT) kit, to overcome all their objections.

My methodology included: (1) Literature Review; (2) Draft of Guidelines; (3) Data from Experts; (4) Data Analysis; and (5) Rewrite of Guidelines. The (1) literature review was used to find what others had done with respect to implementing effective increased hands-on activities in their classrooms. From those studies, data was gathered that increased the likelihood of improving the effectiveness of my hands-on activities approach in my classroom. The (2) draft of guidelines detailed my choice of experts with reasons I chose them, and how I would gather the needed information to help me find the best, most efficient path toward achieving my stated purpose, guided by the critiques and suggestions they would provide. The (3) data-from-experts section discussed my sequential plans to ask questions of each of my experts, in what order, under what circumstances, and how I would document that information, pending data analysis. The (4) data analysis was to be where the collected data was searched for patterns that pointed to positive or negative aspects of my methods or materials that was to be shown to each of my experts. Where there was a majority who suggested a change, it was to be used to improve my plan. The (5) rewrite of the guidelines was where I was to improve my guidelines to include the criticism and suggestions from my experts. In this rewrite, I had hoped to perfect my plans through consensus of the collective wisdom of my experts.

## **IMPLEMENTATION**

### **Review of Literature**

From my literature review of five peer-reviewed articles, I saw a preponderance of the data in-favor of the use of collaborative work-groups in hands-on, object mediated learning activities, especially in the areas of critical thinking and memory retention, which I had not previously considered as a primary benefit of hands-on activities. Most of the literature agreed with what I had already suspected, which was that tactile learners learn best from what they can accomplish in hands-on activities. The second surprise from the literature was that students who manipulated physical objects in their environment, and examined them from various perspectives, could identify and understand hidden relationships that would not necessarily have surfaced, if students had been merely exposed to lecture information, and/or photos of those objects.

### **Experts**

I interviewed my experts, after furnishing them with all articles from my literature review, as well as my methodology paper, my AHOT PowerPoint, assembly instructions and drawings, along with a video of the assembly and use of the AHOT, showing it running.

My experts were comprised of four, Career and Technical Education (CTE) professors, three with Master's degrees; and two with PhDs. One PhD is the dean of my college counseling center. The other PhD is a tenured professor at CSULA and is an adjunct faculty at my school. Each of the other CTE professors I interviewed had over a decade of experience teaching college students, such as mine. One of these three was a Professional Engineer (PE) in the field of Supply Chain

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Technology (SCT), and specialized in automated systems and robotics. Another CTE professor taught Engineering Drafting, and was formerly a designer and manager for a robotics company. My final CTE professor taught at another community college where I was an adjunct instructor for 17 years. She holds a M.S. STEM-Ed, CTE and teaches in the Electricity/Electronics Department. Each of my experts worked in industry prior to becoming a professor. They all communicated well and were not shy in voicing their opinions. They served on multiple college committees with me in the past, which is one of the reasons I chose to invite them to participate as my experts. They were very personable and had been very helpful in my previous interactions with them. The dean of the counseling office holds a degree in counseling, and was previously the dean of Disabled Student Services, and Programs (DSPS). She had 11 years of experience with DSPS, and 7 years of experience as the dean of our counseling department. She is very personable and helpful; and, while very tactful, she expresses her opinions honestly and easily. When I asked them for help on this project, each of my experts eagerly supported me and set time aside to help me.

### **Summary of Results--Suggestions and Patterns of Agreement**

- All my experts agreed with the literature--that to maximize the effectiveness of hands-on activities, and the associated learning, with the increased memory-retention, collaborative work-groups of three to four students would be the best configuration for small groups.
- All five of my experts agreed with the literature—that manipulations of physical objects can reveal hidden relationships that might only be recognized and understood in hands-on activities.
- All my experts gave positive feedback about the Affordable Hands-On Trainer (AHOT) kits I am developing for my classes. Although, four of my experts thought that I needed better drawings, detailing fewer steps on each, with the instructions for assembling the

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AHOT kits, including a Closed-Captioned video of one being built, from start to finish, as a more explicit guide that could be reviewed later.

- Only the dean of our counseling department suggested that giving students choices of several different hands-on activities would be more beneficial to student engagement and a feeling of democracy in the classroom. The others had no strong feelings, one way, or the other about this issue.
- Only the dean of counseling suggested that I allow students to choose their own teams, thus allowing females to team up with females, she said this was because they work better on all-female teams. In our group meeting, at the end of the individual interviews, the others had no objections to allowing students to choose their own teams.
- While all five of my experts liked my PowerPoint for the AHOT, they all thought I needed more slides so that I could show smaller increments of progress on each slide, thus making it simpler to follow.

### **Effect on Final Product**

In my literature review, I read multiple reports praising the use of collaborative work-groups, which I had not previously considered as a primary benefit of hands-on activities. And, my experts agreed with this small group configuration from my literature review. Now, I have included that in my final product, because I can see the value of collaboration within teams. Besides, I have always had my students work in teams of two, or three, anyway, because of limited parts and equipment in labs. For me, it was also used as a self-policing configuration--students working in teams could more easily check that they were properly following directions. So, it costs me nothing to implement small groups. I merely need to make sure that each team

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has at least three team members, now. However, I have never liked having teams of four. This is because the fourth team member seems to have nothing to do: one student reads the textual directions; one interprets the pictures and diagrams; one performs the assembly; and, the fourth, in most cases, just seems to watch the others do the work, without participating as a contributing member of the team. This means that I will now specify a preference of three-person teams, but will occasionally allow teams of four, maximum, when required to add an extra team member who is not already part of another small group.

Based upon the consensus of my experts, and my professional opinion:

1. I **will** generate better drawings, detailing fewer steps on each, with the instructions for assembling the AHOT kits, including a Closed-Captioned video of one being built, from start to finish, as a more explicit guide that can be reviewed later, if needed.
2. I **will not** initially give students choices of several different hands-on activities, because it is such a large effort to design these. Perhaps, after this first release of the AHOT kits, I can begin to develop more options for students, but not initially.
3. I **will** allow students to choose their own teams and will only assign teams if groups grow too large, or if students cannot form their own groups within a reasonable timeframe.
4. I **will** add more PowerPoint slides, and show smaller increments of progress on each slide.

## **CONCLUSION**

### **Summary of Changes**

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Here are all the changes that **will** be implemented in my product, as driven by my literature review, my professional judgement, as well as from the consensus of my experts:

1. I **will** enable collaborative work-groups by specifying team work in group sizes of three, minimum (and preferred), or four students, maximum.
2. I **will** encourage each member of each collaborative work-group to manipulate the AHOT in various ways, and to examine it from many perspectives, to reveal hidden relationships.
3. I **will** generate better drawings, detailing fewer steps on each, with the instructions for assembling the AHOT kits, including a Closed-Captioned video of one being built, from start to finish, as a more explicit guide that can be reviewed later, if needed.
4. I **will** allow students to choose their own teams and will only assign teams if groups grow too large, or if students cannot form their own groups within a reasonable timeframe.
5. I **will** add more PowerPoint slides, and show smaller increments of change on each slide.

By incorporating the valuable information from my literature review, along with the suggestions, based upon the consensus of my experts, it is hoped that this implementation will be optimized for success in my search for **methods to implement an effective "increased hands-on activities" approach in my classroom**. Based upon feedback from my students, this may lead to increased student satisfaction in my CTE courses. And, I believe that increased student satisfaction may be related to increased student enrollment retention. This is an interesting subject area for another research project in the future.

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