

Chunking, Not Chucking, the Tools: Scaffolding a Tool Identification Unit

Andrew Bailey; Joe Lash; Jason McKibben³

¹ Andrew Bailey is a Graduate Student in the Department of Education at Auburn University,
acb0194@auburn.edu

<https://orcid.org>

² Joe Lash is a Graduate Student in the Department of Education at Auburn University,
jpl0040@auburn.edu

<https://orcid.org>

³ Jason McKibben is an Associate Professor in the Department of Education at Auburn University,
jdm0184@auburn.edu

<https://orcid.org/0000-0003-2080-202X>

Chunking, Not Chucking, the Tools: Scaffolding a Tool Identification Unit

Introduction/Need for innovation or idea:

Agricultural mechanics offers a wide range of opportunities for students to learn about structures, small engines, welding, electricity, and hydraulics (Faulk et al., 2024). Given the diverse nature of agricultural mechanics, active pedagogies offer a hands-on approach that enables students to work in group settings and learn the functions and purposes of the selected tools (McKibben et al., 2023). As students approach large tool identification assignments, they often feel overwhelmed by the extensive list. It has been observed that agriculture teachers tend to avoid concepts that they feel uncomfortable with or have not yet mastered (McKibben et al., 2022). To mitigate the challenges of a significant tool identification assignment, Vygotsky's zone of proximal development and scaffolding can help expand students' knowledge of agricultural mechanics tools (van Geert & Steenbeek, 2005). The scaffolding principle in place involves breaking down the assignment into smaller, more manageable tasks and having the instructor interact with these tools or materials during that week's lecture (van Geert & Steenbeek, 2005). As students begin to interact more in-depth with the assignment, research has proven that hands-on educational experiences tend to boost students' confidence and improve their mastery skill level (McKibben et al., 2022).

How it works/methodology/program phases/steps:

Students in an introductory agricultural mechanics course at Auburn University, are tasked with identifying 110 examples of materials and tools from an assigned list of approximately 400 different tools. The tool list includes 22 broad categories related to agricultural mechanics. Students participate in weekly assignments that request students to take a "selfie" with tools or materials from each category. Students create a PowerPoint presentation of at least ten slides that include five tools or materials from each category corresponding to the lecture given that week. On the PowerPoint slide, students include the name of the tool along with a one to two-sentence description of the tool. Additionally, on the slide is the "selfie" along with the retail price and vendor. Students have the leisure to find the retail price online or at a local store. These weekly assignments last for eleven weeks, allowing students to complete the whole project in chunks.

Results to date/implications:

In the original published iteration Daughtry et al. (2019), students completed 100 tools and materials as a single project that was due at the end of the semester. However, many students were either submitting the assignment incompletely or not submitting at all, with excuses of time and the sheer mass of effort in one large project. A reimagined, scaffolded, version of the project was developed. Students submitted assignments every week, chunked down (Gobet, 2005). After the first week of students visiting the local hardware store, students began to stay after class hours to explore the agriculture mechanics laboratory for the listed tools and materials.

Future plans/advice to others:

To increase the instructional impact, the plan is to monitor the study on a larger scale to help guarantee that the strategies remain effective. Using Vygotsky's theory of scaffolding helps prevent overload to the students while keeping them engaged. Additionally, setting aside time each week to adequately provide feedback is necessary when addressing misunderstandings and supporting students' success.

Costs/resources needed:

There are minimal cost requirements for the students. Most tools listed on the handout are in the agricultural mechanics classroom. If the [University] does not own a particular tool discussed, the instructor provides a list of local vendors that stock the said item. Students have the freedom to seek out those items on their own after class.

References:

- Daughtery, K., & McKibben, J. D. (2019). Selfies as a Learning Tool. *ResearchGate*.
<http://dx.doi.org/10.13140/RG.2.2.12158.97607>
- Faulk, B., McKibben, J. D., Clemons, C. A. & Linder, J. R. (2024). Instructor Levels of Importance and Competence With Alabama Agricultural Mechanics Standards. *Journal of Southern Agricultural Education Research*, 74(1).
<http://jsaer.org/wpcontent/uploads/2024/12/74-Faulk-McKibben-Clemons-Lindner.pdf>
- Gobet, F. (2005). Chunking models of expertise: Implications for education. *Applied Cognitive Psychology*, 19(2), 183-204. <https://doi.org/10.1002/acp.1110>
- McKibben, J. D., Giliberti, M., Clemons, C. A., Holler, K., & Linder, J. R. (2022). My ag teacher never made me go to the shop! Pre-service teacher's perceived self-efficacy in mechanics skills change through experience. *Journal of Agricultural Education*.
<https://doi.org/10.5032/jae.2022.03283>
- McKibben, J. D., Holler, K., Clemons, C. A., & Linder, J. R. (2023). Locus of control and pedagogy in skill-based agricultural mechanics. *NACTA Journal*.
<https://doi.org/10.56103/nactaj.v67i1.88>
- van Geert, P., & Steenbeek, H. (2005). The dynamics of scaffolding. *New Ideas in Psychology*, 23(3), 115–128. <https://doi.org/10.1016/j.newideapsych.2006.05.003>