Commentary

Targeting Assessment for Learning within Pharmacy Education

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Formative assessment is critical for deliberate improvement, development and growth. While not entirely synonymous, assessment for learning (AFL) is an approach using formative assessment to specifically improve students’ learning. While using formative assessments, AFL can also have summative programmatic-assessment implications. For each learning assessment, summative and formative uses can be leveraged; it can scaffold (formative), foster students’ growth (formative), and document students’ development in a competency/standard (summative). For example, using a developmental portfolio with iterative reflective-writings (formative), PharmD students showed qualitative development in the “professionalism” competency (summative; ACPE Standard 4.4). (In parallel, this development in professionalism was confirmed quantitatively.) An AFL approach can complement other assessments; it can be integrated with other summative assessments into a multi-method assessment program, wherein developmental portfolio sections could be used for a few specific competencies. While AFL is not a one-size-fits-all silver bullet approach for programmatic assessment, it is one notable robust tool to employ.

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Introduction

Students’ cognitive development in learning is a necessary and important aspect of higher education.1-3 Just as readers have seen children grow physically and mature mentally, adults develop as well. While some models of adult development have stages through which all healthy adults eventually progress,4 moral,5 cognitive,6 and intellectual7 development models identify advanced stages that not all adults will attain. These models of moral, cognitive, and intellectual development can be strongly influenced by further education.8 For Doctor of Pharmacy (PharmD) students, educators need to ensure the development of each student pharmacist from the beginning of their PharmD program until their graduation. Further, in this era of accountability, educators need to assess, document, and show learners’ development. The purpose of this commentary is to challenge traditional assessment practices and suggest one approach, assessment for learning (AFL), for use in pharmacy education.

What is Assessment for Learning?

For over half a century, education has grappled with formative and summative learning assessment uses.9 Formative assessments use informal assessments focused on providing feedback for improvement; these are often contrasted with summative assessments that use formal evaluations at the summation of a topic and/or course. Much of traditional learning and programmatic assessment use an assessment of learning (AOL) paradigm,10-14 which is closely related to summative assessment. Using assessments summatively for evaluation decisions can be more straightforward and concrete to understand for external stakeholders. Alternatively, for internal stakeholders such as educators and students, using assessments formatively can be far more powerful for meaningful growth in students’ learning.

In more recent decades, use of formative assessment at times has included feedback to a program and/or instructor.15 The concept of AFL was used to put the focus back on students and their learning.10-14 Thus, AFL involves assessed students and includes only those formative assessment uses focused on promoting students’ learning. That is, using assessments formatively and AFL are not entirely synonymous; not all formative assessment uses are AFL.16 For example with the Pharmacy Curriculum Outcomes Assessment (PCOA), a formative assessment use could be to evaluate an institution’s PharmD curriculum from their students’ scores; this is not AFL. However, AFL is providing each student with feedback from their individual results, as well as suggestions for each student’s improvement. In short, AFL is
assessment focused on promoting each individual student’s learning, and “is a catalyst for growth and development.”\textsuperscript{17}

In literature reviews, this AOL/AFL terminology has been uncommon,\textsuperscript{18,19} and appears quite new to pharmacy education. Meanwhile primary and secondary education texts on AOL/AFL have been available for some time.\textsuperscript{10,11,20} A decade ago, this very enriching concept was introduced and contextualized for higher education.\textsuperscript{13,14,21} More recently, the classroom-based AFL concept was extended to programmatic assessment of medical (professional) education,\textsuperscript{12} with insight for using assessment data from AFL within evidence-based, summative program-level decisions. As further indication of its importance, AFL has become a section title in the health-professions education journal Medical Education.\textsuperscript{16} At this time, discussion of an AFL approach has proven pertinent and should be helpful within pharmacy education.

Notable Assessment for Learning Methods

Two notable AFL methods are summarized here. They should not be construed as the only AFL methods; however, these two methods have recently been described within pharmacy education.

\textbf{Portfolios.} Student portfolios are common among pharmacy schools.\textsuperscript{22} Most often in today’s improved technological era, online portfolios are employed (ie, e-portfolios). Though, with these improved technological capabilities, portfolios can become very large and filled with much, perhaps too much, information. As a framework, there are multiple uses for portfolios of different sizes; these have been reviewed previously.\textsuperscript{23,24} In summary, uses can include:

\begin{itemize}
  \item \textit{Management or Administrative Portfolio.} The management “portfolio” (also referred to as “assessment management system”\textsuperscript{22}) is a systematic collection wherein everything a student has done is recorded within it; this can very easily become simply a dumping ground for documents. This use should be understood as fundamentally different than learner-centered portfolio formats.\textsuperscript{22} While a management “portfolio” can be used for programmatic assessment, its utility appears limited by the sheer amount of documents that must be, but cannot easily be, integrated into summative judgments of individual students’ progress. Its use also seems limited outside of administrative reports that verify which students have completed which assignments; it does not assess what those students had actually learned while doing those assignments. This portfolio is institution-centered.

  \item \textit{Learning Portfolio.} Learning portfolios display learning artifacts/products commonly selected by students.
\end{itemize}

A distinct advantage of this portfolio is that each student selects and writes descriptions reflectively for their chosen artifacts within this portfolio, documenting artifacts that were meaningful to their individual learning. One disadvantage is consistency between portfolios, wherein students may not choose the same artifacts for their portfolios, with diversity in artifacts limiting superficial comparison between students’ portfolios (though deeper comparison of attained competencies may become more reliable). This portfolio is learner-centered.

\textbf{Reflective Portfolio.} The reflective portfolio is a middle ground between the management or administrative portfolio and the learning portfolio.\textsuperscript{25} As its name implies, this portfolio requires students to reflect on the learning artifacts documented. These portfolios do not contain only student-selected learning artifacts, but required components that are aligned with a program’s accreditation standards. Thus, these reflective portfolios can be used for programmatic assessment, but often are negatively viewed by students and faculty; these portfolios are often time-consuming for students to complete, are detailed and inflexible to student choices, and can be unwieldy for involved faculty based on its sheer size.\textsuperscript{26} Although unpopular among learners,\textsuperscript{26} this portfolio is still considered at least somewhat learner-centered.

\textbf{Developmental Portfolio.} A further extension (or sub-section) of reflective portfolios is the developmental portfolio, which documents students’ learning while focusing more specifically on a student’s growth over time. Thus, a developmental portfolio (or even a developmental “folder” within a larger portfolio) can help students to scaffold their reflection toward development. These artifacts document that development has taken place. Not all accreditation standards seek development nor require portfolio evidence; these more selective portfolio folders may help with programmatic assessment of students’ development within some accreditation standards. This portfolio is learner-centered.

While the descriptions above are all termed “portfolios,” not all will foster AFL. The large volumes of data within an administrative portfolio make it the least conducive for AFL. Students need to reflect toward their growth, and their required reflective writing on all assignments within an administrative (or reflective) portfolio could become excessive and overwhelmingly unhelpful for meaningful reflection if required for every assignment. Conversely, a pharmacy education example of a developmental e-portfolio, composed of multiple integrated longitudinal self-reflections, showed qualitative development and then quantitative confirmation of professionalism development\textsuperscript{18}—ACPE’s Standard 4.4.\textsuperscript{27} (Many details like pre-readings, iterative reflective questions,
and some reflective responses are within that report.\textsuperscript{18} It would seem that portfolios would be most useful to learners if used with development in only a few competencies/standards (eg, Standards 4.1, 4.2, 4.4, 10.5, 11, or 12.2).

**Entrustable Professional Activities.** This assessment method is built on describing competency milestones that learners need to obtain at certain points during their education and training. For the past few years, the use of entrustable professional activities has grown within medical residency training, marking expected initial competencies as well as progressions that residents must demonstrate throughout a residency training program.\textsuperscript{28} This premise was shifted to pre-licensure medical student education (eg, professional activities such as obtaining a patient’s medical history or collaboratively interacting with other health care professionals), entrusting students, over repeated interactions in varied patient settings, to competently complete these patient care activities.\textsuperscript{29,30}

A more recent article described an approach to student assessment using entrustable professional activities in pharmacy education.\textsuperscript{31} Of note, using entrustable professional activities is not necessarily AFL; it can be, but AFL requires providing individual students with helpful feedback for their development. That is, assessing and trusting students with these foundational professional activities can be leveraged for AFL; there is potential for providing students with rich feedback to improve their abilities with foundational professional activities. Thus, pharmacy educators must remain vigilant to use this assessment positively. As experienced assessment experts within medical education, Eva and colleagues caution that a lingering desire for some raters to simply “check a box” can result in students only achieving a minimal competency to pass an assessment, as opposed to excelling and going beyond that level of ability which is good enough to pass.\textsuperscript{32} While “box-checking” can seem quickest and easiest for some evaluators’ time in that moment, pharmacy educators must overcome a minimalist “box-checking” tendency, as it is the least helpful in providing meaningful feedback for students. This “box-checking” tendency can become a vicious cycle of increasingly minimal scoring, leading to increasingly minimal student feedback, resulting in increasingly minimal opportunities for growth in students’ learning – and losing any potential for AFL.

**Multiple Assessment Sources: Can Summative and Formative Assessment Purposes Be Combined?**

Moving from using only AOL to using some AFL is not an easy paradigm shift. As Harrison and Wass reported, AFL has been a challenge to integrate within predominately AOL-focused systems in medical education.\textsuperscript{33} Of note, Schuwirth and van der Vleuten have described progressing from an AOL-based paradigm of assessing performance on a single, high-stakes learning assessment toward an AFL-based paradigm using multiple methods and data sources for programmatic assessment.\textsuperscript{12,34} For instance, in pharmacy education, an AOL approach for deciding whether PharmD students are ready for advanced experiential rotations could involve using scores from the standardized PCOA as a single high-stakes assessment or as combined scores with a summative objective structured clinical examination. Instead, an AFL approach might include using other data sources in decision-making; multiple data could include a student’s PCOA score, scores from objective structured clinical examinations throughout a student’s PharmD curriculum, evaluation of their portfolio, their performance on other assignments like written formulary or drug information papers, their presentations, and prior experiential evaluations. With AFL, decisions do not rest on a student’s single performance on any one assessment, as with an AOL-based approach. Instead, an AFL approach uses numerous assessment data sources together in decision-making, with multiple low-stakes assessments throughout a curriculum. Evaluators using an AFL approach would evaluate data from multiple instances in which students had multiple opportunities to learn and grow.

Learning assessments should not be dichotomized into uses that are purely formative or only summative; learning assessment uses can include both.\textsuperscript{32,35} However, deliberately harnessing formative use will often times need more thought; formative uses are not often within many educators’ usual assessment paradigm.\textsuperscript{10-14} One example of a combination would be administering multiple quizzes to verify students’ content knowledge – including scores in final grade calculation (ie, summative), while also leveraging the iterative quizzes to provide ongoing formative feedback (eg, “How am I doing with course content at this point? Am I remembering, understanding, and applying concepts well at this point?”). Thus, AFL can be used even if there are also summative uses for an assessment.

While one college of medicine has focused on this approach programmatically,\textsuperscript{36} AFL is not exclusive to non-traditional programs of assessment; it can and should be integrated into traditional programmatic assessment. As a notable example, traditional medical education programs have used a portfolio-based approach as one assessment method within their competency-based education.\textsuperscript{37} While AFL is not quick or easy to accomplish, other formative AFL strategies have recently been
reviewed in medical education using traditionally categorized summative assessments (eg, progress testing). While developmental portfolios and enturable professional activities are notable methods for AFL, they are not the only choices; in fact, any summative method for AOL, paired with feedback for individual students’ formative growth, can be leveraged for AFL.

Implications for Pharmacy Education

More than a decade ago, Miller, van der Vleuten, and Schuwirth all described that any single assessment method is not enough; multiple assessment methods are needed within any programmatic assessment. In the evolution to a competency-based framework for medical education, O’Brien noted that multiple formative performance assessments (“biopsies”), trackable milestones and enturable professional activities were needed. Pharmacy educators can learn and grow from this medical education insight for monitoring students’ learning using multiple assessment methods instead of using only one high-stakes assessment.

In theory, the above observations from medicine’s professional education should differ little from their application to PharmD education. In following with medical education’s movement to competency-based outcomes, the 2013 CAPE Educational Outcomes have a competency-based influence. Additionally, the Accreditation Council for Pharmacy Education (ACPE) has provided standards requiring repeated formative learning assessments throughout every PharmD program. In parallel, ACPE’s 2016 PharmD guidance document suggests using various learning assessment methods formatively and summatively. To this end, a faculty toolkit was published by pharmacy education assessment specialists to help guide formative assessment.

Moving Forward. Assessment has a powerful influence on learning, with potential positive and/or negative consequences. Educators are tasked with making assurances that, wherever possible, productive learning outcomes result (eg, validation as a process to analyze outcomes from various learning assessments in each college’s local context). Recently, Fjortoft discussed challenges with assessing PharmD Standard 4; it seems that AFL presents one approach in solving these challenges. Using an AFL approach for some PharmD Standards, especially those desiring growth such as personal and professional development, could be very helpful in facilitating and documenting development of student pharmacists as they evolve into future health care professionals. However, using only one tool toward AFL (eg, developmental portfolios including longitudinal reflective writings) will not be a silver bullet for all programmatic assessment. Instead AFL can become one robust tool, along with other assessments, for meeting a limited number of specific accreditation standards.

As a final note in promoting AFL, this commentary should in no way read as a call to drop all current programmatic assessment activities. It should be regarded as a suggestion that AFL be considered for some applications rather than a blanket default to an AFL approach for all assessment activities. Educational assessments should not be dichotomized into formative and summative types except to illustrate the overwhelming overreliance of many present practices (inside the classroom as well as programmatically) for a summative AOL approach. An AOL approach is needed at times, but should not be used exclusively. Periodic assessments can harness a test-enhanced learning effect, where quizzes can stimulate students’ retrieval and retention of knowledge; though even this can be complicated. Regardless of AFL, AOL or a combination of approaches, validation is paramount, with its positive and/or negative implications for pharmacy education. Whether beneficial toward retained usable learning from course material or harmful with superficial, bulimic learning, assessment drives learning. Undoubtedly, leveraging formative assessment use requires more resources for these activities (such as a higher workload from involved faculty), but facilitating development of learners in pharmacy education should be worth it!

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