

External Review of Research

The Applied Baccalaureate Degree:
An Emerging Pathway to Technician Education

NSF-ATE Targeted Research Grant
No. 10-03297

6/18/15

Amy A. Germuth, Ph.D.
EvalWorks, LLC



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Executive Summary

The National Science Foundation's Advanced Technological Education (NSF-ATE) program awarded funding to the Office of Community College Research and Leadership (OCCRL) at University of Illinois at Urbana-Champaign to document new and emerging Applied Baccalaureate degree programs in STEM fields, especially AB programs affiliated with NSF-ATE centers and projects. Detailed information about how these programs operate and meet student and employer workforce needs were examined, described, and disseminated to multiple audiences, including community college administrators and instructors, employers, researchers, and policymakers.

The overarching research questions guiding the study were:

1. What AB degrees are associated with NSF-ATE centers and projects?;
2. What are the optimal partnerships between community colleges, universities and employers to offer AB degrees?; and
3. What are the outcomes of student enrollment in AB degrees?

Interviews conducted with six persons across the US whose roles as education researchers around community college issues, administrators or instructors at community college, and/or school or state-level policymakers, and thus are in a position to know this research, revealed the following:

1. All interviewees regarded the research conducted under this grant as excellent, having far-reaching implications, and critical to understanding the role of AB degrees in STEM education.
2. All interviewees believed that the mixed-methods approach taken reflected the most robust study design, and that the questions the study sought to answer were critical to the field. Furthermore, recognizing that outcome data are hard to come by and that population numbers are relatively small, interviewees noted that the data collected via site visits and on-site interviews were critically important.
3. Although some interviewees might have defined AB degrees somewhat differently, many noted that the strength of the definition that Dr. Bragg utilized is that it best reflects the current understanding of AB degrees in the US educational system while also not assigning AB degrees to any particular institution type.
4. Even where interviewees were unable to comment on whether this research had pushed new policy agendas, all interviewees reported that it had brought attention to the issue of AB degrees in STEM education, while also placing it within a national perspective.

Overview

Applied Baccalaureate (AB) degrees are a growing phenomenon in postsecondary education. Designed to articulate with applied associate degrees and provide a means for educating technical students to meet workforce demands, many recognize them as having the potential to stimulate the nation's economy. As a result, federal and state policymakers are paying closer attention to both community colleges and science, technology, engineering, and mathematics (STEM) fields as drivers of economic change. With this in mind, the National Science Foundation's Advanced Technological Education (NSF-ATE) program awarded funding to the Office of Community College Research and Leadership (OCCRL) at University of Illinois at Urbana-Champaign to document the development of new and emerging AB degree programs in STEM fields, especially AB programs affiliated with NSF-ATE centers and projects. With this grant, OCCRL began a 4-year study to identify the context, structure, scope, and outcomes of these degree pathways and related exemplary and promising practices, to inform college administrators and faculty, employers, researchers, and others who have an interest or investment in emerging approaches to college completion.

The overarching research questions guiding the study were:

1. What AB degrees are associated with NSF-ATE centers and projects?;
2. What are the optimal partnerships between community colleges, universities and employers to offer AB degrees?; and
3. What are the outcomes of student enrollment in AB degrees?

To answer these questions, work was divided into three project phases, the Landscape Study, the Participatory Field Study, and the Translational Phase. Each is described in detail below.

Phase 1 – The Landscape Study (*August 2010 to March 2012*)

Phase I of the project involved the creation of an active, experienced advisory committee to advise on all aspects of the project; the use of online surveys to collect detailed information about the AB degree programs, student demographics and student outcomes; and descriptive analysis of the shape and scope of AB degrees from the perspective of 2- and 4-year institutions and their partners. This phase of the project concluded with the identification of sites to engage in in-depth qualitative case studies of AB degree programs. The final report from Phase I of the project was released in March 2012.

Phase II – The Participatory Field Study (*December 2012 to November 2014*)

As part of Phase II of the project six Applied Baccalaureate programs were identified for further onsite study. Teams consisting of a researcher and practitioner-expert visited community colleges, universities, employers, students, program graduates, and other partners to learn how

AB programs operate and how students/graduates experience and perceive them. Data sources included interviews, focus groups, document reviews, and collection of student- and institutional-level data. These six sites were:

1. CyberWatch Center, Maryland - multiple degree options related to cyber security
2. Oklahoma State University Institute of Technology – Bachelors in Technology in Information Technology
3. Daytona State College, Florida – Bachelor of Science in Engineering Technology
4. Lakeland Community College, Ohio – Biotechnology AB
5. Bismarck State University, North Dakota – BAS in Energy Management
6. Idaho State University – BAS and BAT in multiple disciplines, including numerous STEM programs of study
7. Bellevue College, Washington - BAS in Information Systems & Technology

Phase III – The Translational Phase (August 2010 to July 2015)

Phase III of the project focused on the dissemination of results, building upon the first two major reports.

Methodology

As part of the summative evaluation of this project, the external evaluator identified, with the help of OCCRL, persons very likely to know of the research that had been conducted under this grant. These included persons involved with community colleges, whether as administrators or instructors, researchers who study community colleges, and community college or state-level policymakers who are likely to utilize research findings. The evaluator contacted ten persons by email (see Appendix A) to arrange a time to conduct a phone interview to ask how they viewed the quality of the research conducted under this grant. Six persons participated in interviews, among them three researchers, two community college representatives, and one policymaker. Interviews were conducted in May 2015 and utilized a semi-structured interview protocol (see Appendix B). Calls were not taped; instead the evaluator took copious notes throughout the interviews.

Findings

Familiarity with Research and AB Degrees

All interviewees were asked to indicate, on a scale of 1 = Not at all Familiar to 5 = Very Familiar, how familiar they were with 1) the research that the Office of Community College

Research and Leadership at the University of Illinois at Urbana-Champaign has conducted about Applied Baccalaureate Degrees, and 2) Applied Baccalaureate degrees, in general. These questions were asked to provide a gauge of interviewees' knowledge about both areas in order to better understand their subsequent responses and to ascertain that all interviewees had enough knowledge to respond accurately to the interview questions.

As is shown below, average ratings were 4.33 and 4.52, respectively, with small standard deviations (0.52 and 0.84, respectively), indicating that most respondents rated themselves very similarly. Only one person rated themselves below 4.00 with respect to familiarity with AB degrees and no ratings were below 4.00 in terms of their familiarity with OCCRL's research on AB degrees.

	Mean	sd
Familiarity with OCCRL's research on AB degrees	4.33	0.52
Familiarity with AB degrees, in general	4.52	0.84

Defining AB Degrees

Interviewees were asked to comment on how AB degrees were defined for this study. The study used Townsend, Bragg, & Ruud's (2009) definition that described Applied Baccalaureate degrees as "a Bachelor's degree designed to incorporate applied associate courses and degrees once considered as terminal or non-baccalaureate level while providing students with higher-order thinking skills and advanced technical knowledge and skills so desired in today's job market". Interviewees were provided this definition and then asked 1) if they believed that this definition accurately defines AB degrees, 2) what they liked about the definition, and 3) what they would change.

Five interviewees responded that the definition was appropriate, making comments such as, "Think it is fine.", "Is accurate – I like it a lot because it captures the applied nature and gives the sense of the potential pathway there and connectedness.", and "This definition reflects the US and the structure of higher education there – so utterly appropriate in that context."

Additional comments provide a more nuanced view of this definition. For example, one interviewee stated that the definition "reflects that community colleges were established with a transfer role and AB degrees do not have a transfer role." Another commented, "[The definition] captures the applied nature and gives the sense of the potential pathway there."

Others noted that the definition was "inclusive" and so could apply to AB degrees in the US, although there are differences in many of these degrees across states. One interviewee commented that not associating the nature of the AB degree with an institutional type was

politically perceptive. However, one interviewee believed that the definition suggested that AB degrees were terminal degrees, which he or she viewed as problematic, arguing that instead the definition should describe these degrees as “intending to lead to immediate employment”. This interviewee noted that one question that remains unanswered is whether universities will recognize AB degrees as appropriate levels of training for entrance into a Master’s program or whether they will only consider persons who have earned non-applied Bachelor’s degrees as potential students for such programs.

Study Orientation and Scope

Next, interviewees were reminded that the research under discussion involved studying AB degree programs in STEM fields, especially AB degree programs affiliated with NSF-ATE centers and projects, to understand how they operate through partnerships and ascertain whether they meet students’ and employers’ workforce needs. Interviewees were asked to comment on whether they believed that such a “lens” was useful for studying current AB degree programs.

All interviewees believed that the lens through which this research was being conducted made sense, with interviewees making such comments as “Nothing seems missing.”, “Makes a lot of sense.”, and “ABs lend themselves to STEM fields, so a useful lens.”

One interviewee commented that looking at outcomes including whether AB degrees meet employer’s and students’ needs was crucial: “All AB program should be evaluated based on outcomes – did grads get jobs?, were they in their field of study?, what are their wages?, what do employees think of their work?, can they matriculate to graduate school or are they not eligible to do that? Increasingly, in STEM, I think that we have to be careful that we do not ensure them that the level of knowledge they are going through is enough to enter a Master’s degree program. This is where the challenge is – we are beginning to see students graduating from these programs and their expectations that their math skills are high enough is unrealistic. This is worthy of further development.”

Some interviewees elaborated on the connection to NSF’s ATE program, with one noting, “Given the nature of NSF’s ATE program and focus on community colleges and helping them respond to technician education priorities, this makes sense. [This lens] adds understanding to NSF’s investments and AB degrees overall.” Another interviewee was more circumspect, stating, “The ATE program is for community colleges. The issue is whether community colleges should be offering these kinds of degrees. Her definition sidesteps this question and this research doesn’t look at this issue. But within ATE programs, that’s an issue of concern for the ATE centers.”

Interviewees were very positive about the research questions that the study sought to answer.¹ As one interviewee commented, “Given her definition, the research is a documentation of what is occurring, which is important and it needs to be done. These questions are good.” Whereas others noted that the questions “cover the landscape” of AB degrees, are ones that they are interested in, and that the questions were “comprehensive”.

Multiple interviewees commented on how critical the question about student outcomes is, with interviewees describing the need to know employment rate of graduates, compensation levels, employer level of satisfaction, and whether these degrees offer greater access for Latino and African-American students. Other questions they had were 1) What about AB degree programs make them attractive?; 2) How did internships, etc. contribute to these programs success?; and 3) Do students’ get enough training in theoretical knowledge to study at higher levels?

Study Methodology

To conduct their study, the researchers used a mixed-methods approach whereby they gathered basic information about AB programs at NSF Centers and projects via an online survey, used these results to develop a more extensive survey that was sent to those programs that appeared to provide AB degrees, and then conducted case study site visits to a subsample of these programs to gather more in-depth information. Interviewees were asked to address how suitable they believed this approach was, given the questions that were being asked and what was being studied, and how they themselves would have conducted this research.

All interviewees believed that a mixed-methods approach was the best design for the study, given that the goal of the study was to describe the state of AB degrees in STEM fields associated with NSF ATE Centers. One interviewee also commented that this design was particularly strong, given that there is not enough quantitative data regarding student outcomes to understand the impact of AB degrees on employment, etc. Below are just three responses:

“Great model – we have done outcomes assessment and evaluation [on this] at [organization], but the data is so spotty it’s hard to see whether students are in the

¹ The questions were: 1) What AB degrees are associated with NSF-ATE centers and projects? How were these AB degrees developed? What models are used, and how do the models vary by STEM field?; 2) Who teaches in these programs, and who is enrolled? What does the curriculum offer, and how does it work? What incentives and barriers exist to transferring students from applied associate (AA) to AB degrees?; 3) What are the optimal partnerships between community colleges, universities and employers to offer AB degrees? How strong are relationships between community colleges and universities supporting the transferability of AA degrees to the AB, and how do these relationships work? How do employers contribute to these partnerships, including to implementation of AB degrees?; and 4) What are the outcomes of student enrollment in AB degrees?

pipeline or not. So this is a good approach and is what is needed right now – there are not enough quantitative data to understand everything yet.”

“The design is excellent – there is no other way to get at this when you are trying to generally describe what is going on – and what is emerging at the state and college level. They did this exactly the right way. No other strategies would have given her more valid and reliable results.”

“Mixed methods is the strongest design. What I like is that she understood the need to document / scan / inventory the program since that is seriously missing. The quality component in that is hard to do - to contextualize down from the survey - so the site visits were a good idea. It also allows persons to see more of what is out there.”

Interviewees were asked to indicate what information about AB degree programs they were most interested in learning more about, despite many of them already making that clear in responses to other questions. All of them responded that they were most interested in understanding the student and employer outcomes, and impact or “effectiveness” of these programs, as one interviewee described it. Specific questions they identified were:

Student Outcomes

1. Are students getting jobs and how high paying are they and are they in their field?
2. Do students have access to graduate programs with AB degrees?
3. What are the graduation rates?
4. What are the cost-benefits to students?

Employer Outcomes

1. Are employers happy with student’ preparation?
2. Do employers see a difference in and benefit from hiring students who have a more theoretical knowledge base?
3. What are the cost-benefits to employers who hire students with these degrees?

Broader Employment Outcomes

1. To what extent are these programs associated with improving the status of states on the new economy index?
2. Do these degree programs increase access to jobs for marginalized populations? What do they do to the globalization of the workforce and digitalization of the economy?

Programmatic Outcomes

1. Is there a divide among those teaching in AB degrees and those not?

2. Are community college instructors supported to develop AB degrees and do they have the necessary theoretical knowledge to teach in them?
3. Do programs teach students the specifics and then move to general, or vice versa?
4. Is there a danger in specializing in such a narrow area as technology which, as technology changes, may alter that area to such a degree that persons may find themselves unemployed? [The example given was the move from developing apps for PCs to cell phones and Tablets].
5. How much demand for these programs is from the workforce versus community colleges who think companies should want this?

Study Impact

Last, interviewees were asked whether OCCRL's research had pushed new policy agendas or identified new research questions related to AB degree programs. Of the six interviewees, the policymaker definitely believed that this research had affected policy decisions, whereas the others (who were in less of a position to know) strongly voiced that this research had pushed conversations forward and provided a national perspective on AB degrees. As one respondent commented, "I think that this is the type of research that was really needed. It has taken a snapshot and described it. Whether it has impacted policy, I cannot say. But the overall agenda is very political at the local and state levels and even, somewhat, nationally." Another offered, "[This research] has really helped policymakers get a national perspective on AB degree programs. This is huge – it brings a national perspective to this issue and helps us communicate with community colleges and universities, etc. She is getting what is happening at California, which will really have an impact. So it is bringing a national weight and helps everyone see that it is huge on a national scene. [This is] very exciting, because she has a lot of credibility." Other comments were, "Kept it in the conversation...and is making people think about new models of post-secondary education.", "It has promoted a lot of critical conversations in the academic arenas.", and "Helped build understanding about AB degrees and may have given a nudge to more states to be willing to allow community colleges to provide AB degrees."

Summary and Discussion

Interviews conducted with six persons across the US, whose role as education researchers around community college issues, administrators or instructors at community college, and/or school or state-level policymakers, revealed that they believe that the research led by Debra Bragg for the NSF ATE grant "The Applied Baccalaureate Degree: An Emerging Pathway to Technician Education" was excellent, has had far-reaching implications, and has been critical to understanding the role of AB degrees in STEM education. All interviewees believed that the mixed-methods approach taken reflected the most robust study design, and that the questions the study sought to answer were critical to the field. All interviewees indicated that they are very

interested in understanding the outcomes of AB degrees on students who pursue them and employers who hire graduates with these degrees. Recognizing that these data are hard to come by and that population numbers are relatively small, interviewees indicated that the data collected via site visits and on-site interviews were critically important. Although some interviewees might have defined AB degrees somewhat differently, many noted that the strength of the definition that Dr. Bragg identified is that it best reflects the current understanding of AB degrees in the US educational system while also not assigning AB degrees to any particular institution type. Even where interviewees were unable to comment on whether this research had pushed new policy agendas, all interviewees reported that it had brought attention to the issue of AB degrees in STEM education while also placing it within a national perspective. Across the board, comments indicate that the area of research was worthy of investigation and that the investigation conducted by Dr. Bragg and her colleagues was of the highest quality.

Appendices

Appendix A: Sample Email to Potential Interviewees

Appendix B: Phone Interview Protocol

Appendix A: Sample Email to Potential Interviewees

Subject: Request for Phone Interview – Applied Baccalaureate Degrees

Dear XXXXX:

I am serving as the evaluator for a NSF ATE research project where Debra Bragg, Gutgsell Endowed Professor at the Office of Community College Research and Leadership at University of Illinois at Urbana-Champaign is the PI.

As part of this project Dr. Bragg and her colleagues have studied Applied Baccalaureate degrees, documenting the type of AB degree programs available in STEM fields, especially AB programs affiliated with NSF-ATE centers and projects. Detailed information about how these programs operate and meet student and employer workforce needs have been described and disseminated to multiple audiences, including college administrators and instructors, employers, and researchers.

Debra Bragg provided your name to me as someone who may be familiar with her work in this area. I am writing to ask if you are willing to participate in a short phone interview so that I can hear your opinion on such things as:

- How do you define applied baccalaureate degrees?
- Were the questions, issues, problems, purposes, or scopes of the studies worthy of study?
- What do you believe this research has added to this field of study?
- What information about AB degree programs are you most interested in learning more about?
- Has OCCRL's research pushed new policy agendas or research questions related to AB degree programs?
- Where should research on AB degree programs go in the future?

I would like to conduct this interview sometime the week of XXXX. If you are willing to participate, please let me know what dates/times might work for you that week and I will set a time where I will call you. Please also send the best phone number at which I can reach you.

Thank you in advance.

Best regards,

Amy Germuth

Appendix B: Phone Interview Protocol

1. How familiar are you with the research that the Office of Community College Research and Leadership at the University of Illinois at Urbana-Champaign has conducted about Applied Baccalaureate Degrees?

1 = Not at all familiar / 5 = Very familiar

2. How familiar are you with Applied Baccalaureate Degrees, in general?

1 = Not at all familiar / 5 = Very familiar

3. Townsend, Bragg, & Ruud (2009) defined Applied Baccalaureate degree as “a bachelor’s degree designed to incorporate applied associate courses and degrees once considered as “terminal” or non-baccalaureate level while providing students with higher-order thinking skills and advanced technical knowledge and skills so desired in today’s job market”. Other researchers have defined it differently. Do you think this definition accurately defines AB degrees? What do you like about this definition? What would you change?
4. The Office of Community College Research and Leadership have recently been studying how AB degree programs in STEM fields, especially AB programs affiliated with NSF-ATE centers and projects, operate through partnerships and meet students’ and employers’ workforce needs. Do you think that this was a useful lens by which to study AB degree programs? Why or why not?
5. Following is a list of questions that the researchers sought to answer:
 - a. What AB degrees are associated with NSF-ATE centers and projects? How were these AB degrees developed? What models are used, and how do the models vary by STEM field?
 - b. Who teaches in these programs, and who is enrolled? What does the curriculum offer, and how does it work? What incentives and barriers exist to transferring students from applied associate (AA) to AB degrees?
 - c. What are the optimal partnerships between community colleges, universities and employers to offer AB degrees? How strong are relationships between community colleges and universities supporting the transferability of AA degrees to the AB, and how do these relationships work? How do employers contribute to these partnerships,

including to implementation of AB degrees?

- d. What are the outcomes of student enrollment in AB degrees?

Are there any critical questions missing from these that were studied? If so, what are they?

6. To conduct this study, the researchers used a mixed-methods approach whereby they gathered basic information about AB programs at NSF Centers and projects via an online survey, used these results to develop a more extensive survey that was sent to those programs that appeared to provide AB degrees, and then conducted case study site visits to a subsample of these programs to gather more in-depth information. Do you think that this mixed-methods approach was suitable? If this were your study, how might you have researched AB degree programs?
7. In your opinion, have AB degree programs narrowed the mission of community colleges?
8. What information about AB degree programs are you most interested in learning more about?
9. Has OCCRL's research pushed new policy agendas or research questions related to AB degree programs?
10. Where should research on AB degree programs go in the future?