AC 2007-1172: FIVE YEARS LATER: THE INSTITUTIONALIZATION AND SUSTAINABILITY OF ADVANCE

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Abstract
Most studies on higher education transformation tend to focus on the factors (e.g. leadership, resources, and “culture”), processes (e.g. initiation, implementation, management) and theories (e.g. teleological, social cognition, cultural) of organizational change. Relatively little attention has been paid to how and at what level externally funded initiatives, like the NSF ADVANCE program, are institutionalized and/or sustained within a higher education organization. The concepts of sustainability and institutionalization are interrelated but there are differences. Sustainability of a program can be achieved with external funding and no institutional support. Institutionalization is achieved when the university makes a “permanent” financial commitment (i.e. line item) to a project or some aspect thereof. Ideally, a college or university could and would fully fund and completely institutionalize a project like ADVANCE. However given budget constraints, it is most likely that a combination of sustainability and institutionalization is necessary for ADVANCE and projects like it to continue at the institutional level.

In this preliminary study, the authors draw on conceptual frameworks of institutionalization and institutional theory to analyze issues of sustainability and institutionalization of ADVANCE among the seven of nine colleges and universities examined here that received the NSF grant in 2001. The authors use data from interviews with key persons at each institution to examine the factors and extent of institutionalization of ADVANCE. In addition, the authors explore the implications of externally funded projects for diversity within higher education and make recommendations.

Introduction
Changing population demographics have had a significant impact on the composition of the United States workforce. In a recent study, Lynn Karoly and Constantijn Panis found that women ages 16 and older increased their workforce participation from 34% in 1950 to 60% in 2002 relative to men whose participation rates were 86% and 74%, respectively. Labor force participation rates have also increased among racial and ethnic minorities. For example, African-Americans’ labor force participation rate increased from 60% in 1973 to 64% in 2005 while Hispanics’ participation rate increased from 60% to 68% for the same years. The U.S. Department of Labor reported in 2001 that women and minorities now comprise 60% of the U.S. workforce – a shift consistent with the prediction made by the Hudson Institute in 1987.

These population changes and growing concerns about American competitiveness reinvigorated an interest in “diversity,” particularly in science and engineering (S&E). Several studies on the S&E workforce warn of labor shortages caused by the growth in workers of retirement age, skill gaps, immigration restrictions after September 11, 2001, and growing competition abroad from countries that historically supply S&E workers. According to the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering, and
Technology Development (CAWMSET), the shortage could be avoided “if women, underrepresented minorities, and persons with disabilities were represented in the U.S. science, engineering, and technology (SET) workforce in parity with their percentages in the total workforce population”7. In 2005 women and underrepresented minorities (African Americans, Hispanics, and American Indians/Alaska Natives) were 46% and 24% of the U.S. workforce population, yet they comprised only 26% and 10% of the S&E workforce29,38,39.

Researchers find a similar discrepancy exists between women and minority S&E degree earners and their proportion as college/university S&E faculty members. In 2003 women earned 37% of the S&E degrees but made up 30% of S&E faculty30. Although the S&E faculty proportion appears to be reaching parity, this figure masks the reality that most women hold lower academic positions – assistant professor and instructor. Job patterns observed for women are comparable to patterns for underrepresented minorities. While underrepresented minorities earned 13% of S&E degrees and were approximately 9% of S&E faculty, they were more likely to hold lower rank faculty positions and be employed at comprehensive academic institutions40. In their analysis of diversity at the “top 50” departments in research institutions, Nelson and Rogers found that “the percentage of women among recent PhD recipients is much higher than their percentage among assistant professors, the typical rank of recently hired faculty ... [and] under-represented minority women are almost nonexistent”31.

The anti-Affirmative Action climate in the U.S. has led many higher education institutions, with assistance from foundations and federal agencies, to devise and implement alternative strategies to increase underrepresented groups in academic science and engineering careers. Specifically, many colleges and universities applied for the National Science Foundation’s ADVANCE Program for Institutional Transformation (ADVANCE), which was launched in 2001. The purpose of ADVANCE is to increase the recruitment, retention, and advancement of women in academic science and engineering careers by transforming higher education institutions. NSF funds recipient institutions for five years and requires that each college and university sign a cooperative agreement, which means that each institution must have deliverables. The first group of institutions received an ADVANCE grant in 2001 and the second group received a grant in 2003. The first round of ADVANCE grantees is now ending their five years, and the issue of institutionalization has become extremely salient. Institutional transformation does not happen quickly in most cases, and so sustaining and/or institutionalizing ADVANCE is very important.

In this preliminary study the authors examine how and at what level externally funded initiatives, like the NSF ADVANCE program, are institutionalized and/or sustained within a higher education context. The authors begin by reviewing the literature on conceptual frameworks of institutionalization and institutional theory to analyze issues of sustainability and institutionalization of ADVANCE among seven of the nine colleges and universities that received the NSF grant in 2001. The authors then present results from and discussion of key informant interviews and state expenditure data. The paper ends with conclusions and recommendations.

**Institutional Theory and Higher Education**
At its core, institutional theory suggests that organizations are based on, and make changes subject to the greater environment around them. Environments can include information about cultural scripts, language usage, rules and norms. Early institutionalists such as Merton and Parsons were some of the first to articulate an approach to organizations that was institutional in level\textsuperscript{24,32}.

Institutional theory in the field of sociology is well suited to respond to the situation of higher education institutions\textsuperscript{25,26}. In higher education, universities are based on a global or at least national model for how higher education should work. A university that lacks conformity with other institutions and the rules that govern higher education would not be able to persist\textsuperscript{25}. Colleges and universities have survived because of their concordance with common cultural norms and models for higher education institutions worldwide. This makes them institutions.

Scott discusses a primary distinction in institutional theory, which is that much of the work in the area either focuses on the process of institutionalization or on institutionalization as a variable (and thus a cause or effect of other variables)\textsuperscript{33,43}. This paper focuses on institutionalization as a variable rather than a process. The section below discusses the factors which have an effect on institutionalization.

**Factors Associated with Institutionalization**

In the literature four main themes often show up in definitions of institutionalization. These are value, leadership, stability, and diffusion. These four themes are discussed in detail below. The authors use these definitions in the literature to compile four important factors associated with institutionalization.

In a classic work by Selznick\textsuperscript{34}, he defined institutionalize as “to infuse with value”. He also wrote that when organizations are institutionalized this means that they are established and considered valuable. Institutionalization then reflects the values of those who are part of the organization, and results in the need to continue the things that the members of the organization perceive as valuable.

This idea of value is also highly correlated with leadership. Curry writes that the same things that affect organizational change are what affect whether an innovation endures (is institutionalized)\textsuperscript{8}. One of the primary factors affecting institutionalization is leadership. Both Curry and Selznick discuss the importance of leadership for institutionalization\textsuperscript{8,34}.

In Curry’s work on “Instituting Enduring Innovations”, she discusses a couple of factors which are important for the level of institutionalization. A primary factor she discusses is leadership. Leaders are needed to support any change at the institutional level. She notes that even those not in the role of leader, can be functional leaders\textsuperscript{8}. However, the ability to lead is also influenced by the power that follows the positional role\textsuperscript{8}. This is important for this project because while all of the first nine ADVANCE sites have functional leaders, not all of the positional leaders have used the power of their position to institutionalize ADVANCE initiatives. It is the role of the leader to prepare the organization by creating a climate for change. Culture plays a large role in institutionalization because organizational values, norms and goals will have a significant impact.
on whether certain innovations are maintained over time. It is the job of leadership to make sure the values and norms of the organization will coincide with the innovation so that change can be sustained.

Selznick writes that leadership has a large role in making sure that what is considered valuable is maintained. By using this institutional perspective, maintenance of an organization is expanded to include the maintenance of a program within an organization, such as particular ADVANCE initiatives. It is only when the university recognizes the value in a particular program or policy that they are willing to take steps (funding, diffusion) to see that it will continue.

Stability also is a theme in the many definitions of institutionalization. One author suggests that institutionalization should be associated with stability over time. Berger and Luckmann write that institutionalization is thought of as a process of creating stable meanings through language and social processes. Curry discusses institutionalization as a part of the organizational change process. For Curry, institutionalization involves the stabilization of the system after the organizational change has occurred. If changes or innovations are not institutionalized, they are likely to be terminated.

Finally, institutionalization has also been defined by diffusion of practices, policies, etc. If other higher education organizations take up programs begun at one institution, this diffusion is a sign of the strength and value of the program, and thus associated with increased institutionalization. However, in the opinion of the authors, if a program or practice is taken up elsewhere but not at the home institution, it is clear that the home institution does not see the value in it. This paper is primarily interested in internal institutionalization. For this reason, diffusion outside of an institution is important, but is not a good measure of level of institutionalization, as conceptualized in this paper. Diffusion within an institution, on the other hand, is a signal of the value of a program, policy or practice and institutionalization. Diffusion within an institution does not occur without the previous three factors, value, leadership, and stability, working together.

If institutionalization is affected by perceived value, leadership advocacy, stability and internal diffusion, the view of the authors is that high levels of institutionalization must involve stable monies such as state appropriations, they must be committed over a significant period of time to be considered stable, and the leadership of the university, who are the guides to the institutional norms and values, must advocate strongly for the value of the initiatives by committing stable funding. After all, it is the leadership who decides where institutional money is allocated. While all universities are suffering from decreases in state appropriations, there typically is some discretionary money which is not already allocated to a specific program. If the leadership does not see the value in the initiatives they are not prioritized and thus receive little or no money, or only from a discretionary source which does not guarantee long term funding.

Empirical studies on institutional transformation or institutionalization of reforms in higher education settings are consistent with the literature mentioned above. In On Change V, Eckel, Green and Hill found that leadership in combination with a ‘propitious’ external environment and flexibility in institutional response facilitated transformation of six out of the twenty-three
colleges and universities that remained in their study. At an ADVANCE PI meeting in 2006, the University of Michigan and Virginia Tech presented findings from their study on institutionalizing ADVANCE transformations. The researchers concluded institutional context, top leadership, and broad participation were essential for achieving ADVANCE goals. In another study presented at the same meeting Bilimoria and Valian pointed out two types of leadership important to the ADVANCE initiative – positional (chairs, deans, provost, etc.) and informal (having influence in department and college/university decision making). Common among these studies is that leadership matters in terms of position, advocacy, and vision.

**Model of factors influencing institutionalization level**

A model of institutionalization must therefore include factors which measure or are proxies for value, leadership, stability, and diffusion. They influence what is considered to be institutionalized. These four factors comprise the working definition used by the research team to understand the meaning of institutionalization of the ADVANCE program at the first nine institutions. Value and diffusion are measured by the number of programs maintained which were successful, and the degree to which they were expanded to the whole university. Stability is measured with funding source and funding duration information. Leadership refers to the level of positional leadership that is spearheading the continuation of ADVANCE.

**Methodology**

The research team utilized a guided interview format with five formal questions and additional probes for those questions. The researchers attempted to contact and interview the principal investigator at each of the nine first round NSF ADVANCE institutions. This research is a preliminary project for a larger study under consideration. An expanded project will involve additional interviews at each of the institutions, at different levels of leadership and association with the ADVANCE program. Unfortunately, as yet, two of the nine PI’s have been unavailable. The research team has attempted to contact them multiple times, but they are both at a high level of leadership and have been very busy. Thus, a total of seven have been interviewed so far, and researchers will continue to schedule the additional two interviews. The research team decided to focus on the first nine ADVANCE institutions because they have reached the end of their 5th year of funding and are now embarking on their first years without external NSF funding, although some of the institutions did request and receive a no-cost extension from the NSF. Therefore, the question of institutionalization is especially germane at these nine institutions.

The interviews lasted from 20 to 35 minutes. The research team promised to keep the interview to approximately 30 minutes to make it easier for respondents to find the time to talk. The interviews were all conducted via telephone, and two researchers were on the call with each respondent. One researcher led the interview and took cursory notes while the other researcher took detailed notes on responses. Each set of notes that were taken from an interview were subsequently assigned a code to make the responses more secure and confidential.

Each question that was asked was related to one or more of the main factors in the literature regarding institutionalization. The main interview questions asked included:
QUESTION 1. What successful or top three programs, processes, and/or policies developed by ADVANCE have been adopted by your university or college? (value, diffusion)

QUESTION 2. How are these ADVANCE initiatives being funded? (value, leadership, stability)

QUESTION 3. Were there any ADVANCE programs, processes, and/or policies that you would have liked to see adopted but were not? (value)

QUESTION 4. Has your university created a new institutional structure, designated a person, or created a position that is responsible for implementing the adopted ADVANCE initiatives? (leadership, stability)

QUESTION 5. Who is leading the efforts on your campus to both institutionalize and sustain ADVANCE? (leadership)

Once the notes were compiled for each interview two researchers independently coded the notes based on the main themes of interest. After separately coding the interviews, the two researchers compared their responses and determined the level of agreement, which reached 80% inter-coder reliability. On the points where there was disagreement, the researchers discussed and agreed on a solution. The results section that follows utilizes the coded interviews to assess trends in institutionalization at the seven institutions under study.

Results

The findings from the interviews and other data collection point to three main propositions: 1. Leadership is a key and essential part of institutionalization, 2. Level of funding for programs is not related to availability of state appropriations, and 3. Institutionalization is indeed measured in degrees and is not simply dichotomous. These three main themes will be discussed in this section.

The concepts of sustainability and institutionalization are interrelated but there is a difference(s). Sustainability of a program can be achieved with external funding and no institutional support. Institutionalization is achieved when the university makes a “permanent” financial commitment (i.e. line item) to a project or some aspect thereof, typically over an extended period of time. These two concepts have been defined in various ways by other authors; for example, Bailey et al define institutionalization as “the extent to which their (program’s) activities were becoming incorporated into the normal, ongoing activities of the college”\(^2\). This is a measure of the diffusion within the institution. This is an important signal that the college or university values the activity. Diffusion within an institution is more likely to be indicative of institutionalization than sustainability.

Leadership

In the authors’ opinion, two institutions were able to fully institutionalize. That is, they were granted internal funding from stable sources to continue all of their successful programs, and the duration of funding for one institution was five years with additional five year renewals possible, and the funding duration for the other was one year but with a very high likelihood of renewal in subsequent years. At each of these universities, the level of leadership pushing hard for institutionalization was at the Provost level. At other universities, the provost has sometimes been involved and has been an advocate, but has not made ADVANCE continuation a priority.
The value assigned to a program like ADVANCE by high level leadership within the university has a profound impact on the ability to keep it going.

Five of the seven institutions had transitions in top leadership. Leadership transitions had positive consequences at one institution, negative consequences at two institutions, and the consequences were not yet clear as regards institutionalization for the remaining two institutions. Some institutions were lucky to have new leadership that believed in the mission of ADVANCE and supported the program’s continuation and growth. The two institutions which gained new leadership who did not advocate for the ADVANCE program to the same degree as the previous leader had lower levels of post-grant internal funding than the other ADVANCE institutions. Two of the institutions are still in “limbo”, not sure whether their new leadership will be supportive. This in-between state slows down the progress of ADVANCE. These examples serve to highlight the importance of leadership for program continuation and institutionalization.

**Funding**

All institutions received at least some internal funding to institutionalize their ADVANCE programs. However, the amount of money and duration of guaranteed funding differed greatly among the seven institutions. Additionally, the level of state appropriations at each of the institutions did not seem to be positively related to the level of internal funding found for the ADVANCE program.

The amounts of internal funding were very different among institutions. Some schools received less than $40,000 from their leadership, one received $75,000, and four other schools received money that varied from $240,000 to $800,000 to be used over a one year period. While all institutions were given one year of guaranteed funding, three of the institutions have confidence that their funding will be renewed in subsequent years, three of the institutions are not sure where money will come from for next year, and one school has been guaranteed funding for five years, with probable renewal in years after that.

The money at each institution is coming from different sources, although all but one institution is receiving some money for program continuation through their Provost’s office. Four of the schools are receiving money from the Dean or College level, and one institution is also receiving money from departments and campus groups.

An initial expectation of the research team was that there would be some positive association between level of state appropriations and the degree to which a university was able to institutionalize their ADVANCE programs. Public universities often complain about the low level of appropriations from the state and the federal government and it becomes a popular scapegoat when programs end unexpectedly. Upon examination of the data, there does not seem to be an association between level of state appropriation and the degree of ADVANCE institutionalization. In a comparison of state appropriations with the interview findings, different colleges and universities had differing levels of state appropriations funding. For the seven first round ADVANCE institutions under study, state appropriations vary greatly as percentage of overall revenue. The values are: 8.2%, 12%, 13%, 16.6%, 19.2%, 26%, and 44.4%. This data is
for the revenue years of 2005-2006 if available, and 2004-2005 if a more recent year was not available.

Interestingly, the two institutions which were able to maintain all of their successful programs had levels of state appropriations which varied from 13% to 19%. Two other institutions have levels of state appropriations at 26% and 44% and neither was able to obtain internal funding for all of their successful programs, although the institution did fund a portion of their programs. Thus, it does not seem that the level of state money flowing into a university significantly impacts the ability to institutionalize a program. The money is found when the program is significantly valued.

The ADVANCE Partnerships for Adaptation, Implementation, and Dissemination (PAID) grant program by NSF was initiated to allow ADVANCE institutions to continue and expand what could be considered their most successful initiative. This grant program is also used to disseminate successful ADVANCE programs to other institutions. Institutions who received the PAID grant for their most successful initiative could then use internal funding on other initiatives they wanted to continue. The PAID grant provides one way to sustain programs until additional funding, either from the institution or from external sources is obtained. Six of the first nine ADVANCE institutions received PAID funding to continue a select initiative. This outside funding is helpful for sustaining these programs until institutional money can be negotiated. Additionally, at some places the ADVANCE programs will always have to look for a portion or perhaps all of their funding from external sources, such as government or corporate grants.

Levels of Institutionalization

Based on the working definition of institutionalization, the level of institutionalization varies to a great degree across institutions. Unfortunately, some like to think that a university has either institutionalized or it has not, and there is no in-between. The authors did not find this to be the case. The level of institutionalization as discussed in the working definition is a combination of funding source, funding duration, diffusion and level of leadership advocacy. All of these are key indicators of “value” which the literature indicates is an important component of institutionalization. Four of the schools had high levels of leadership advocacy, and those were the ones where the outlook on funding for future years was very positive. Three of those four institutions, however, had to also look for external funding to continue their most successful programs.

Level of institutionalization also refers to the location of the initiative. Among the institutions under study, the ADVANCE program will either continue to be administered by the center or office set up to implement the program or it will be subsumed into an existing campus office. There are benefits and costs associated with either arrangement. For example, ADVANCE programs that remain independent offices may face isolation that leads to marginalization, or by remaining a separate entity, the program is able to maintain its visibility and importance. What seemed to matter most to respondents was where the ADVANCE program fit within the college or university hierarchy. Several interviewees stated that if ADVANCE has to go through several layers of “command” before reaching the provost or vice-chancellor’s office, chances are that the program is not a priority for the institution.
Discussion

While finding that top leadership made a difference in institutionalization, the authors noticed that not one person interviewed mentioned advocacy from department chairs. Most, if not all of the first round colleges and universities, spent a significant amount of time working with chairs and it would seem reasonable to expect their active support. Although they do not control large sums of money, chairs play a vital role on college and university campuses. Chairs often have discretionary funds to allocate to projects of interest and as leaders, they influence climate within and outside their departments. It is not clear if interviewees did not mention these leaders because of how the authors phrased the question, “Who is leading the efforts on your campus to both institutionalize and sustain ADVANCE?”, or because chairs are simply not advocates.

The value of specific initiatives is clear based on which were given funding to continue. However, just because all initiatives at an institution are not institutionalized does not mean the program is a failure or that institutionalization is not happening to a large degree. In fact, regardless of strong advocacy from the leadership, not one university institutionalized all of the original ADVANCE programs, but they did institutionalize the most successful ones. The evaluation component of the ADVANCE grant allowed program administrators and campus leaders to identify and advocate for initiatives that should and should not be institutionalized. Perhaps a more realistic conception of value is whether all or some the initiatives that the ADVANCE program director thought should be institutionalized actually were.

There are many successes associated with the ADVANCE program, but colleges face serious questions about funding as it relates to institutionalization and sustainability. The ADVANCE grant is solely funded by NSF and institutions do not have the option to re-apply for ADVANCE funding. For most of the institutions, this meant they had to cut, put on hold or substantively scale back their initiatives as they scramble to find funds to sustain their programs. The other concern is whether it is reasonable to expect transformational change in five years in area so hotly contested as diversity. Research conducted by the American Council on Education on Leadership and Transformation indicates that while transformational change can indeed occur within a five-year period this is not the norm. Institutional transformation was the framework under which colleges and universities implemented ADVANCE, yet, it appears that many of the programs offered primarily individual level support. This is not to say that individual level support (retention and recruitment) is not important. However, the goal of the ADVANCE grant was to transform the institutional environments in which these individual level supports could operate.

In addition to being externally funded, diversity and accountability were not explicitly addressed in the ADVANCE grant. Common to many initiatives, grantors and grantees tend to view their target population(s) as monolithic and not diverse. Some institutions managed to create initiatives that took into account differences among women but overall, race, ethnicity, and (dis)ability were not openly considered important aspects of the ADVANCE grant. In addition to diversity, there was no mechanism for accountability. NSF required institutions to collect data on twelve prescribed indicators but in the annual reports feedback and comments were less
germane to the overall goals of ADVANCE. As a consequence, there were no standard definitions or measures for the indicators despite the labor-intensive nature of collecting the data.

Given that this a preliminary study, several caveats apply. First, the researchers interviewed one person at seven of the nine institutions that received a grant in 2001. Without the participation of a variety of stakeholders per campus and the remaining two universities, a more comprehensive picture of first round institution experiences is not available. Researchers did make several attempts to include the two colleges/universities. Second, formal outcomes of institutionalization were the focus of the study. The researchers would have liked to present both the formal and “informal” (cultural change) outcomes but found significant lessons could be learned from understanding an institution’s formal commitments. Third, generalizations should be made with caution because of the selectivity of the sample. The colleges and universities self-selected to participate in the ADVANCE program.

Conclusion

The authors of this paper chose to focus on a few factors identified by the literature on institutional theory and institutionalization in relation to the ADVANCE grant status at the first nine universities. What emerged from the interviews was that leadership is a key and essential part of institutionalization. Secondly, funding for programs is not related to availability of state appropriations, and lastly, institutionalization is indeed measured in degrees and levels.

Many of the successful ADVANCE initiatives on each campus were institutionalized. However, challenges remain for the colleges and universities: 1) how to find and sustain funding for “big ticket” initiatives like ADVANCE fellowships or faculty transitional support programs and 2) maintaining ADVANCE goals when the program has been moved to an existing campus office whose mission is not consistent with ADVANCE. These challenges should be met head on by the second round institutions as they begin to think about institutionalization and sustainability.

There is so much more to be done on this topic, and while some of the data is already available to the authors, additional work should be done on the topic of institutionalization. Furthermore, the framework laid out in this paper is one that the authors intend to test with additional data and resources.

Institutionalization is a huge issue with these sorts of government funded programs where funding drops off after 5 or more years. By gaining a better grasp on what has an impact on institutionalization; it may be possible to more strategically work the higher education system to ensure that a particular program will continue after government funding expires.

Based on study findings, the authors make several recommendations:

1. Further research on institutionalization in general should be undertaken, especially government seed grant programs
2. The implications of the NSF’s policy of providing only seed grant money should be examined
3. Studies of institutionalization and sustainability in the post first round ADVANCE institutions should be commenced and funded by the NSF, as the findings would be very informative for NSF policies
5. Strategies should be developed in advance to deal with leadership transitions, especially if that person or persons are key advocates of a program or policy change, and
4. A clear articulation between ADVANCE program goals and university vision should occur. This means buy-in not only from those advocating for change at the “grassroots’ level but also the engagement and support of top administration.

Further study is needed to present a more comprehensive picture of institutionalization and sustainability in higher education. There is much research on what it takes to begin and implement change but little understanding of the unintended consequences of these changes and what the change(s) look like over the long-term, particularly in higher education institutions.

Bibliography


