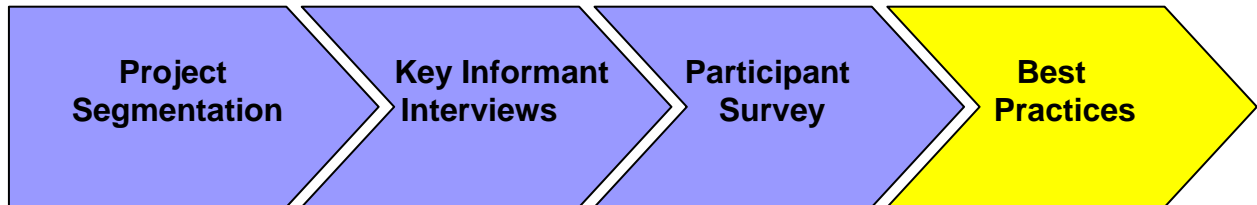**Evaluation of Professional Development Efforts Of ATE Projects and Centers
Phase IV Report**

This report details the results of Phase IV: Best Practices.

Project Segmentation	Key Informant Interviews	Participant Survey	Best Practices

Phase IV had two objectives: (1) identify best practices in the professional development of community college faculty through a review of the literature and (2) contrast the cumulative results of the three previous phases including the most successful implementations and most effective programs and activities with those best practices.

It should be noted that the majority of the literature reviewed in this phase addresses the professional development of elementary and secondary teachers and not necessarily community college faculty. We believe that these findings are relevant to the current study though they are not focused as directly on the target audience as we would have preferred. This, however, represents an opportunity to augment the body of knowledge concerning the development of community college faculty through this work.

Findings in Professional Development Literature

The following are our findings from a review of the professional development literature.

   Professional development is a process. Absent from the literature on professional development is a comprehensive definition of the construct. No one accepted definition exists of professional development and hence, no reliable establishment of construct validity. Despite the lack of definition, the literature would suggest that professional development should be viewed as a process.

For example, Keiny (1994) describes teachers constructing their own unique theories of teaching through investigating their own practice. He consequently defines professional development as "a process of professional growth" (p. 158) but offers no definition of what he considers to be professional growth. Grossman (1994, p. 58) focuses on the professional development experience (or process) of teacher development and describes such things as workshops, study groups, fireside chats, action research projects, and the acquisition of different ideas and conceptualization of what constitutes teaching based on those experiences.

Bell and Gilbert (1994) also view professional development as a process. They identified three types of development: personal, professional, and social. They also describe what

they consider to be the key features of the teacher development process including the input of new theoretical ideas and new teaching suggestions and the opportunity to try things, evaluate, and practice these new theoretical and teaching ideas over an extended period of time. These trials should be in a collaborative situation where teachers are able to receive support and feedback and where they are able to reflect critically.

Finally, Evans (2002) offers a broad definition of teacher development as a process whereby a teacher's professionalism may be considered to be enhanced. Included in her conceptualization is the idea of attitudinal development as the process whereby teachers' attitudes regarding their work are modified and functional development as the process whereby teachers' professional performance may be improved.

Eight specific characteristics of quality professional development. Across a number of different studies, we identified eight different characteristics or features associated with higher quality professional development. These eight include:

- *Professional Development Type:* Desimone, Porter, Birman, Garet and Yoon (2002) investigated the effects of professional development type on the overall quality of the program. They compared what they termed "reformed types" of activities (such as networking, internships, study groups, and resource centers) to more traditional collaborative approaches such as workshops or conferences. They found that school districts supporting such reformed types of activities or processes are more likely to be engaged in continuous improvement efforts and have increased (teacher) active learning.

- *Hands-On Activities:* Professional development programs that stress hands-on learning are significantly more successful in improving attitudes and confidence (i.e., efficacy) in teaching both math and science (Basista & Mathews, 2002; Feazel & Aram, 1990; Green, 1991). Sanders and Schwab (2001) suggested that professional development should address what the literature refers to as "hitches"—discrepancies between what exists in the real world of learners and teachers and what is expected. Hands-on workshops are potent tools because they provide teachers an opportunity to practice resolving these discrepancies (assuming they are solvable, within the scope of their responsibilities, and adequate support is available).

- *Duration:* The duration of professional development is strongly related to the degree of (subsequent) student impact. Specifically, opportunities for faculty to participate in professional development activities over an extended period of time rather than just short brief workshops or conferences, have been statistically associated with higher student performance and greater sustained positive change (Cohen & Hill, 2000; Guskey, 1986; Wiley & Yoon, 1995). Cook and Fine (1996) argued that professional development cannot occur as a result of one-day workshops or single training sessions (i.e., it cannot be an event). They suggest that professional development must be continuous, ongoing, and built with the input and insights of teachers. Furthermore, it must be of sufficient duration to facilitate one's critical thinking, meditation, and support collaboration; and it must accommodate follow-up and

support that is sustained over a long period of time (i.e., must be a process). This type of development can be found in a number of varieties including mentoring, modeling, ongoing workshops, internships, special courses, observations, and institutes (Rodriguez & Knuth, 2000).

- *Reflection/Practice Time:* Bradley (1995) reported that professional development participants indicated that they much preferred ongoing activities that allow opportunity to do, reflect, and acquire new skills. Deshler and Schumacher (1993) stressed that teachers must be given time to implement and practice interventions in order to successfully effect changes in schools.

- *Teacher's Efficacy:* In a significant number of studies investigating the attributes that increased the probability of success in improving teachers' skills, a teacher's efficacy (or belief that they have some understanding of and comfort with the content being presented) was key to successful skill development (Anyon, 1994). In 1994, DeMesquita and Drake demonstrated a strong relationship between teacher efficacy and subsequent attitudes toward utilization of newly acquired (or reformed) teaching practices. Lehman (1994) demonstrated that many faculty members have inadequate knowledge or efficacy to successfully integrate new science and math curricula.

- *Content/Classroom Focus:* The focus of the content of the professional development activity is also related to the success of the effort. Specifically, it has been shown that the degree to which the professional development activity is focused specifically on improving and deepening teachers' content knowledge is critical especially in the areas of mathematics, science, and technology (Desimone et al., 2002; Smith & Desimone, 2003). Similarly, a number of studies, including those by Borko and Putnam (1996), Cohen and Hill (2000), and Little (1993) have demonstrated that professional development is more effective when it is linked closely to teachers' actual classroom focus and experience.

- *Perception of Professional Development Quality:* Garet, Birman, Porter, Yoon & Desimone (2002) demonstrated that higher quality professional development was correlated with higher degrees of positive faculty improvement. High quality professional development was training that was focused on enhancing knowledge, exposure to new ideas and materials over several sessions, and a measure of cooperation and collaboration.

- *Peer Coaching/Group Participation: I*ncorporating peer coaching and group involvement (i.e., school or district involvement) into one's design of professional development has been shown to greatly increase the implementation of the training into the classroom (Desimone et al., 2002; Joyce & Showers, 1988; Persky, 1990). For example, the Florida Department of Education (1999) reported that in professional development workshops where peer coaching was not a part of the program, only 10 percent of the participants subsequently implemented the instructional approach.

Goals of effective professional development. Cook and Fine (1996) identified ten specific goals for effective professional development. They stated that professional development

- is an essential component to higher student achievement; it also enriches teaching and advances learning for all students.
- supports the development of teachers as individuals and professionals
- is considered a key component of teaching—as vital as classroom instruction
- is a process conducted in a long-term sustained program
- is job-embedded and inquiry-based
- supports current theories regarding teaching and learning
- is based on a growth potential premise rather than a deficit model
- addresses goals and objectives for school improvement and is clearly associated with reform efforts
- is modeled after learning experiences and best practices considered valuable for adults
- supports systemic change

Professional development has a number of obstacles to overcome. The literature identifies a number of specific obstacles to professional development activities.

- *Time Constraints.* Sanders and Schwab (2001) noted that with the daily schedules of teachers being so full and the social structure and requirements of most education institutions, little time or energy is left for professional development or to reflect about their teaching decisions or development goals. Organizational expectations that have little to do with teacher growth take priority and teachers are pressured to satisfy those requirements first. In their study of the top inhibitors to professional development, Zimmerman and May (2003) found that most common inhibitors to professional development was lack of time.

- *Lack of Money.* The second most common inhibitor to professional development according is lack of money. Similar to corporate settings, many school board members view professional development as a frill, and as such it is often one of the first budget items to be cut in a "money crunch" situation (Zimmerman & May, 2003). For example, Persky (1990) found that community colleges have generally undervalued the benefits of professional development and often require that faculty members be responsible for covering the cost of their own training and development.

- *Lack of Change Willingness.* Without organizational support to implement change, teachers cannot benefit from staff development programs. Sparks and Hirsh (1997) stated that

> There is often an unrealistic hope that dramatic changes would occur in schools as a result of staff development programs designed to help individual teachers and administrators. The flaw in this assumption is the failure to recognize that organizational constraints make it difficult for individuals to consistently apply over time the understandings and skills they have acquired. Teachers may learn a new instructional skill but find that their use of it gradually

diminishes because no one else in the school is using it or because their administration does not support the practice (p. 17).

- *Guilt.* Many teachers take significant pride in their classroom and often feel guilty for being out of the classroom or for having a substitute teacher be responsible for their classes while they are participating in professional development (Zimmerman & May, 2003). This would suggest that the best professional development might take place when school is not in session but it must then be followed up with nonobtrusive support.

Contrast of Findings and Best Practices with the First Three Phases

First, we will summarize the key findings/results from the previous phases. Table 1 below presents a summary of the findings from Phases I, II and III:

Table 1: Key Findings/Results from Phases I, II and III

Phase	Finding/Result	Implication
I	Selected 12% (n = 12) of the 104 projects that completed the 2003 ATE Annual Survey based on linkages between professional development and/or materials development or program improvement to serve as focus of overall study. One question that emerged was where do the ATE projects fit in the larger NSF scheme? Are ATE projects performing professional development as an end outcome, or are they using professional development as an intermediate step in driving toward student and workforce impact as the model suggests?	Sample was representative of the professional development activities funded by ATE and the populations served. Sample also served as the basis for identifying key informants to participate in interviews for the subsequent phase. This fundamental issue must be addressed in order to ensure that project-specific goals and objectives are in line with overall ATE program goals and objectives.
II	Differences in data between initial survey and subsequent key informant interview. Specifically, these were a number of differences in the data provided regarding number and type of professional development activities, number of participants involved, and the variety and basis for any type of follow-up activity.	Required recasting of the classifications of the sample projects based on their respective linkages between materials development and/or program improvement and professional development. Although changes were made, the implications are minimal since the criteria were used for selection purposes, and the changes were not statistically significant.
II	The accountability of the respective program was assessed, and what is regarded as professional development is occurring. There are different goals and target audiences and different perceptions of what actually constitutes professional development.	Future research and studies must comprehensively and operationally define what constitutes professional development in order to reduce the ambiguity of these constructs.
II	The effectiveness of the programs was also assessed, and the overall assessment is mixed. Several projects have produced compelling evidence supporting their claims of effective implementation of some type of professional development. Included in that evidence are sound empirical studies containing defensible information and data. A couple of programs provided little compelling evidence of effectiveness. Their evidence supported their claims of implementation but not necessarily of effectiveness.	Future program requirements should include specific requirements and explanations of what constitutes compelling evidence of professional development effectiveness.
II	Programs asserted that they were impacting their target audiences by making a difference. Impacts included direct outputs such as number of faculty using newly acquired skills, number of students increasing, and new technologies being adopted. Additional impacts included changes in policies and procedures including adopting new curricula and establishment of departments.	Future program requirements should include specific requirements and explanations of what constitutes compelling evidence of professional development impact. This should include a systemic process for identifying, collecting, and reporting impact data and evidence.
Phase	Finding/Result	Implication
II	The organizational context was also assessed. A number of key factors were identified in terms of obstacles/barriers as well as	Strategies and tactics should be developed for addressing these very common barriers, and best

	enablers to accomplishing the goals or objectives of the various projects. Barriers included such things as funding cuts, organizational structures, and union agreements. Enablers included job aides, organizational support, and the structures.	practices should be shared.
II	Unanticipated consequences were assessed. Projects incurred both positive and negative unanticipated consequences of their activities. Positive aspects included such things as program improvements through having participants teach back material, benefits of networking, and support from the private sector. Negative consequences included such things as lack of participation and faculty dropping out due to their reluctance to adapt new approaches or technologies.	Unanticipated positive consequences should be documented and fed back to the program designers and implementers in order to help ensure the likelihood of occurrence again in future programs. Programs should identify active strategies to avoid and prevent negative consequences.
III	Most projects are reaching their target audience. However, many participants expressed dissatisfaction with being exposed to certain technologies but being unable to utilize them in their classrooms because their organization was not willing or could not afford to implement them.	Programs should strive to continue to correctly identify their constituency and target audience. In addition, part of this frustration could possibly be avoided by requiring programs to conduct more extensive needs and target audience analyses.
III	Workshops were the most common professional development activity attended.	Given that participants tend to participate in workshops, programs should ensure that workshops are "process" focused, which would include follow-up and activities over time.
III	Improving teaching skills and preparing faculty to teach a specific curriculum are the most common goals of professional development activities.	Periodic needs analyses and assessments should be conducted to validate these specific goals.
III	Development of faculty skills is focused on becoming a better teacher, not just improving technology skills.	Best practices would suggest that programs should focus specifically on context and classroom and not on general components of faculty development.
III	Opportunities to experience hands-on activities were viewed by participants as the most effective, had the most impact, and were the most satisfactory.	Some type of hands-on activity should be a required component in ATE-funded professional development opportunities.
III	Stated use of specific content is the most commonly referenced evidence of program impact.	Processes for documenting specific use of content should be developed.
III	There is a significant difference among the ability to implement ideas and materials, adopt ideas and materials, and satisfaction with professional development activities between event type activities and process driven activities.	The trend for the majority of professional development activities to be event based should be changed. Programs should provide process driven activities.
III	There is a mismatch between the most effective format for professional development activities (in terms of ability to implement ideas and materials, adoption of ideas and materials, and satisfaction with programs) and the type of activities that the majority of participants are attending.	This mismatch must be addressed. Programs should provide process driven activities.
III	There is no relationship between level of support and the most effective components of professional development activities or their impact.	In the future, investigation of support should be limited to actual dollars provided and not include subjective criteria such as encouragement from supervisors.

Consistencies with Best Practices and the Findings in the Literature

There a number of consistencies of the current findings with best practices and other findings from the literature.

- *Inconsistent or missing definition of professional development.* The same situation described in the literature as a missing operational definition and subsequent confusion as to exactly what constitutes professional development exists in the current study. There is confusion as to whether the approach or strategy of professional development should be process or event based and whether professional development itself is an outcome or is an intermediate step to a much different outcome. This situation first manifested itself in assessing the accountability of the

respective programs based on their stated goals and the respective activities offered. Specifically, some principal investigators view their professional development activities and goals as more of an outcome in and of itself, while others view their goals and activities as much more an intermediate step to a completely different outcome. At the same time, some programs offer only process type activities, whereas other programs offer only event type activities and other programs offer both. The situation is displayed in the matrix below where each letter represents one of the 12 projects in this study:

Process	A, D, H, I, J	A, E, F
	C, D, H, I, J, K, L	B, G
Event		

Approach (left axis)

Intermediate   Ultimate
Outcomes/Objectives

Five of the projects clearly indicated that their goal was to increase the capacity or quality of the community college faculty to teach (these five projects appear in the Ultimate column). Seven other projects indicated that their primary goal was to increase the number of qualified individuals in the workforce including the preparation or improvement of elementary teachers (these projects appear in the Intermediate column). One project (A) has both an intermediate goal and an ultimate goal.

Likewise, the professional development approach varies greatly between process driven and event driven activities.

- *Professional Development Type.* The literature demonstrated that the "reformed" type of professional activities were superior to traditional approaches such as workshops or conferences. In the current study, we made a distinction between events (i.e., traditional approaches such as workshops or conferences) and process driven activities (i.e., reformed types such as internships, study groups, online classes, blended activities, etc.). Despite the fact that the majority of participants attend event (or traditional) professional development activities, our findings are consistent with best practices. We found that a statistically significant difference between the ability to implement ideas and materials, adopt ideas and materials, and satisfaction with professional development activities for those participants that participated in process driven activities as compared with the traditional event activities.

- *Hands-On Activities.* The literature clearly demonstrated that professional development programs that have stressed hands-on learning are significantly more successful in developing teachers in both math and science. In the current study, we

demonstrated similar findings. Specifically, professional development opportunities that allowed participants to experience hands-on activities were viewed as the most effective, had the most impact, and were the most satisfactory overall.

- *Duration.* Related to professional development type, best practices suggest that professional development activities that extend over a period of time (i.e., process driven) rather than just brief workshops or conferences (i.e., events), have been shown to produce higher participant performance and greater sustained positive change. We found that the ability to implement ideas and materials, adopt ideas and materials, and satisfaction with professional development activities was significantly better for those participants that participated in process driven (multiple contact over a period of time) activities as compared with the traditional event (one time) activity. In addition, one-day workshops were viewed as the least effective by our panel of principal investigators.

- *Reflection and Practice Time.* Related to professional development type, hands-on activities, and duration, best practices again demonstrate that participants need the time and opportunity to reflect on and practice what they are learning as they acquire new skills. Again, these findings are consistent with the current results indicating that process driven activities are superior in allowing participants to implement and adopt new ideas and materials and that participants are more satisfied with this approach.

- *Content/Classroom Focus.* Content focus is related to the goals of the program and correctly identifying the target audience(s) and their respective needs. As shown in Table 2 below, the programs examined in our study were correctly identifying their respective target audience(s) as evidenced by the high degree of consistency between the stated target audience as identified during the interviews with principal investigators (Phase II) and the actual audience themselves identified via the participant survey (Phase III).

Table 2: Target Audience by Populations

Population	Target Audience*	
	Interviews with Principal Investigators	Participant Survey
Elementary School Faculty	1	1
High School Faculty	2	4
Community College and 2 Yr Technical School Faculty	9	6
4 Yr College/University Faculty	1	5
Future Primary/Secondary Teachers	1	2
Individuals in Technology Workforce	2	1
College Students	2	2

*Note. The number of primary audiences exceeds 12 because some projects have more than 1 primary audience.

Best practices have demonstrated that professional development is more effective when it is linked closely to teachers' actual classroom context and experience. In the current study, the single most common evidence of impact was stated use of specific

content in the classroom. In addition, a number of participants identified the establishment of new curriculums for the classroom as a direct output of their professional development activity.

In contrast to the best practice of targeting specific classroom content or curricula, the most common impact reported by participants in the current study was general faculty development in terms of improved teaching through the use of new approaches and technologies.

- *Perception of Professional Development Quality.* Best practices indicated that higher quality professional development was correlated with higher degrees of positive faculty improvement. In the current study, overall participant satisfaction with their professional development activities received an average rating for "Events" of 4.33 ("Good") and an average of 4.61 ("Good to Excellent") for "Process Driven Activities" on a 5-point scale where 5 = Excellent and 1 = Poor. In addition, nearly 94 percent of the participants rated their level of satisfaction with their particular professional development activity as good or excellent. Events were good, but process driven programs were better.

- *Peer Coaching/Group Participation.* The literature supports that incorporating peer coaching and/or group involvement into one's design of professional development has been shown to greatly increase the implementation of the training into the classroom. Although not generally stated as a direct goal or objective, mentoring, networking, and collaboration (which are related to coaching and group participation) were commonly identified as positive unanticipated consequences of various professional development activities.

- *Time Constraints.* One major study found that time constraints were the most common inhibitor to professional development. In our current study, time constraints did not emerge as a significant barrier. Perhaps one reason for this is that the participants' organizations are viewed as very supportive of professional development activities. In fact, more than 80 percent of the participants told us that they believed their organization is supportive or very supportive of professional development activities. For many, that support came in terms of paid time to attend professional development, so time was not viewed as a constraint.

- *Lack of Money.* In our sample, lack of money and/or cuts in funding were the most common barriers to professional development identified via the participant survey. In the Sanders and Schwab (2001) study, lack of money was the second most common inhibitor to professional development. The most commonly cited type of support was nonmonetary but was in terms of encouragement from supervisors to participate in professional activities.

- *Lack of Organizational Support.* The literature identifies such obstacles as organizational structure and expectations. Another component relative to lack of organizational support was the fact that participants expressed dissatisfaction with

being exposed to certain technologies they were unable to utilize in their classroom because their organization was not willing or could not afford to implement them.

Part of this frustration could possibly be avoided by requiring programs to conduct more extensive needs and target audience analyses. It is certainly not consistent with best practices to introduce participants to new technologies and approaches when their likelihood for adoption is zero or near zero.

- *Guilt.* Zimmerman and May (2003) suggested that many teachers express feelings of guilt for being out of the classroom or for having substitute teachers being responsible for their classes while they are participating in professional development. In our study, time away from the classroom was one of the most frequently cited aspects of what was deemed the least helpful component of the professional development opportunity to their work.

Conclusion

This phase was designed to identify best practices in professional development through reviewing the existing literature and to contrast the cumulative results of the three previous phases with those best practices. A number of best practices were identified, and at least 12 specific examples of consistencies of the current study with those specific best practices were also identified.

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