



College of Education and Affiliated Programs
Annual Assessment Report Template – Fall 2011
Math Education

Note: this report presents and analyzes data from the 2010-2011 academic year.

Background

1. Describe your program (enrollment, number of faculty, general goals). Have there been any major changes since your last report?

The Mathematics Education Program Goals and Mission:

The Master of Arts Degree in Education, Option in Mathematics Education program (EDME program) is a young program dating from 2009. It is a program especially designed for teachers who wish to sharpen their teaching ability in mathematics and to learn effective teaching strategies that are evidence- and research-based, practical and immediately applicable to the classroom. The mission of this program is to provide candidates with the fundamental knowledge and skills of mathematics teaching and prepares socially responsible mathematics teacher leaders for a rapidly changing, technologically rich world. It engages candidates in research, scholarly activity, and ongoing evaluation. Finally, it helps candidates understand the value of diversity as related to the National and State Mathematics Standards and prepares them for a diverse world in which they will serve and collaborate with educators and their communities. The focus of the EDME program is to equip candidates with pedagogical content knowledge that includes knowledge of mathematics curriculum, instruction, and assessment centered on knowing and promoting student mathematical thinking through modeling in mathematical representation and mathematical language.

The Alignment between EDME Courses and National and State Standards:

The EDME courses in this 30-33 unit program were developed to address the *NCTM* [National Council of Teachers of Mathematics] *Principles and Standards* (2000) and the *Mathematics Framework for California Public School* (2005). They are also aligned with the recently released *Common Core State Standards* (2010) for mathematical practice that calls for classroom teachers to prepare mathematically proficient students who make sense of problems and persevere in solving them, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of structure, and look for and express regularity in repeated reasoning.

Student Learning Outcomes (SLOs) in the EDME Program:

Table 1 shows the student learning outcomes (SLOs) in the EDME program. There are seven student learning outcomes from seven courses: EDME 500 (SLO1), EDME 501 (SLO 2), EDME 504 (SLO3), EDME 505 (SLO4), EDME 520 (SLO5), EDME 502 (SLO6), and EDME 685 (SLO7).

Table 1*Program Student Learning Outcomes and Relevant Standards*

	Outcome 1	Outcome 2	Outcome 3	Outcome 4	Outcome 5	Outcome 6	Outcome 7
SLOs	Describe contemporary issues in mathematics education addressed in NCTM and California principles and standards.	Design various assessments, interpret, and use assessment results for planning and teaching mathematics.	Apply research-based instructional strategies in teaching.	Integrate contemporary technologies in mathematics planning, teaching, and assessment at the K-8 level.	Integrate pre-algebra and algebra content and pedagogy in K-8 classrooms.	Design research in their own teaching settings relating to mathematics education.	Collect, analyze and interpret data related to research questions.
Signature Assignments	Literature Review	Action Research	Lesson Study	Technology Integration	Children Algebra Thinking	Research Design	Manuscript/ Report
Conceptual Framework	Promotes growth, Values diversity	Research and evaluation	Promotes growth, Prepares leaders	Prepares leaders	Values diversity Service and collaboration	School improvement Research and evaluation	School improvement Research and evaluation
NCATE	Professional knowledge and skills, Professional dispositions	Pedagogical content knowledge, Student learning	Content knowledge, Pedagogical content knowledge	Content knowledge, Pedagogical content knowledge, Student learning	Pedagogical content knowledge, Professional knowledge and skills	Professional knowledge and skills, Student learning, Professional dispositions	Professional knowledge and skills, Student learning, Professional dispositions

The Students in the EDME Program:

The program recruits diverse candidates who have mathematics classroom teaching experiences and seek to enhance their knowledge and skills in mathematics content and pedagogy for leadership roles in mathematics education. The focus on connecting research to teaching practices and pursuing in-depth study of effective mathematics instruction in this program helps our graduates develop expertise as effective mathematics teachers and mathematics teacher-leaders.

The program had 38 applications in 2010-11, admitted 35, and had 27 of those matriculate (Table 2). In that same year, for students in the first cohort 2009-2011, 22 registered to take the comprehensive exam (Table 3). The program also graduated 21 students in 2010-11 (Table 4).

Table 2

Program Specific Candidate Information, 2010-2011 (snapshot taken F10)

	Transition Point 1		
	Admission to Program		
	Applied	Accepted	Matriculated
	#	#	#
TOTAL	38	35	27

Table 3

Program Specific Candidate Information, 2010-2011 (snapshot taken F10)

	Transition Point 2
	Advancement to Culminating Experience
	#
Thesis (698) ¹	0
Comps ²	22
Project (695) ³	0

¹ This is data on students who were enrolled in thesis work during Fall 2010 and Spring 2011. This figure may include students who actually “crossed into” this transition point prior to Fall 2008 and were still making progress on their theses at this time.

² This is data on the number of students who *applied* to take the comprehensive examination in Summer 2010, Fall 2010, or Spring 2011. The data include students who may not have taken or passed the examination(s).

³ This is data on students who were conducting culminating projects during Fall 2010 and Spring 2011. This figure may include students who actually “crossed into” this transition point prior to Fall 2008 and were still making progress on their theses at this time.

Table 4

Program Specific Candidate Information, 2010-2011 (snapshot taken F11)

	Transition Point 3
	Exit
	#
Degree	21

The Faculty in the EDME Program:

Currently there are four tenure track faculty members and an additional part-time faculty member who teach in the EDME program. Among the four tenure track faculty members, three are full professors, and one is associate professor. The faculty members who teach in the EDME Mathematics Education Graduate Program are: Dr. Shuhua An, Dr. Ella Burnett, Dr. Marina Krause from the Teacher Education Department, and Dr. Babette Benken from the Mathematics & Statistics Department (See Table 5).

There is also a part-time faculty member who has the high level of expertise in mathematics content, mathematics instruction, teacher education, and research in mathematics education. The well-qualified part-time faculty member is a backup of the regular faculty in the EDME Program.

Table 5

Faculty Profile 2010-11

Status	Number
Full-time TT/lect.	4
Part-time Lecturer	1
Total:	5

2. How many of the total full- and part-time faculty in the program reviewed and discussed the assessment findings described in this document? Please attach minutes and/or completed worksheets/artifacts to document this meeting.

In fall 2011, three faculty members (two full-time and two part-time) who taught EDME courses participated in the data discussion meeting. They reviewed and discussed the assessment findings and related documents (SLO rubrics and course syllabi (see Appendix A).

Data

3. Question 3 is in 2 parts focused on primary data sources related to: student learning and program effectiveness/student experience:
 - a. Candidate Performance Data: Provide direct evidence for the student learning outcomes assessed this year and describe how they were assessed (the tools, assignments, etc. used). Describe the process used for collection and analysis. Present descriptive statistics such as the range, median, mean, percentage passing as appropriate for each outcome.

Table 6 highlights the seven program student learning outcomes and the description of the signature assignments that measure those learning outcomes for cohorts 2009-2011 and 2011-2012 in the academic year of 2010-2011.

Table 6

Program Student Learning Outcomes and Signature Assignments

Student Learning Outcomes	Student Learning Outcomes Description	Signature Assignment(s)	Description of the Assignment	Cohort Group
1	Describe contemporary issues in mathematics education addressed in NCTM and California principles and standards.	EDME 500 (Fall 2010)	Candidates write a literature review in mathematics education. The purpose of the literature review is to understand contemporary issues in mathematics education addressed in NCTM and California principles and standards	Cohort 2010-2012
2	Design various assessments, interpret, and use assessment results for planning and teaching mathematics	EDME 501 (Spring 2010, Fall 2010)	Candidates work on an action research project that engages them in the inquiry process of developing assessment instrument, collecting, analyzing and interpreting student assessment data. The purpose of this action research is to help candidates learn and demonstrate their understanding of how summative assessment influences their classroom instruction.	Cohort 2009-2011 Cohort 2010-2012
3	Apply research-based instructional strategies in teaching.	EDME 504 (Spring 2010)	Candidates develop a math lesson study in the area of algebra with their grade level peers. The purpose of this lesson study is to plan standards-based mathematics instruction using different models and identify effective teaching approaches in mathematics instruction from collaborating with their colleagues.	Cohort 2009-2011
4	Integrate contemporary technologies in	EDME 505 (Spring 2011)	Candidates Design a math lesson plan using web quest. Address objectives, standards, materials, motivation ideas, teaching and	Cohort 2009-2011

	mathematics planning, teaching, and assessment at the K-8 level.		learning strategies, procedures of the activity, example of it, and evaluation approach.	
5	Integrate pre-algebra and algebra content and pedagogy in K-8 classrooms.	EDME 520 (Summer 2010)	Candidates design probing questions to assess and develop students' algebra thinking. The purposes of this case study are to understand challenges in children's algebra learning and to develop developmentally appropriate probing questions in an algebra lesson to support struggling students.	Cohort 2010-2012
6	Design research in their own teaching settings relating to mathematics education.	EDME 502 (Fall 2010, Spring 2011)	Candidates develop a research proposal in their own teaching settings relating to mathematics education. The purpose of this research proposal is to apply knowledge and skills of research to design a research plan directly relating to mathematics teaching or learning.	Cohort 2009-2011, Cohort 2010-2012
7	Collect, analyze and interpret data related to research questions.	EDME 695 (Spring 2011)	Based on the research proposals in mathematics education, candidates collect, analyze, and interpret data related to research questions, and write the final research report in the chapter form. The purpose of this final report is to apply knowledge and skills of research to analyze, interpret, and discuss the findings from data collected in teaching practice.	Cohort 2009-2011

Figure 1 shows the comparison of overall percentage of scores ranging from 0 to 4 points between seven program SLOs. The results from Figure 1 indicates that all scores of SLO1 are the 4- point, a majority of scores of SLOs 2, 4, 6, & 7 fall in the 4-point range, and less than 15% of scores of SLOs 3 & 5 falling in the 2-point range. Approximately 60% of students had the mean score at 3 with SLO3.

Figure 1

Math Education AY10-11 SLO Comparison

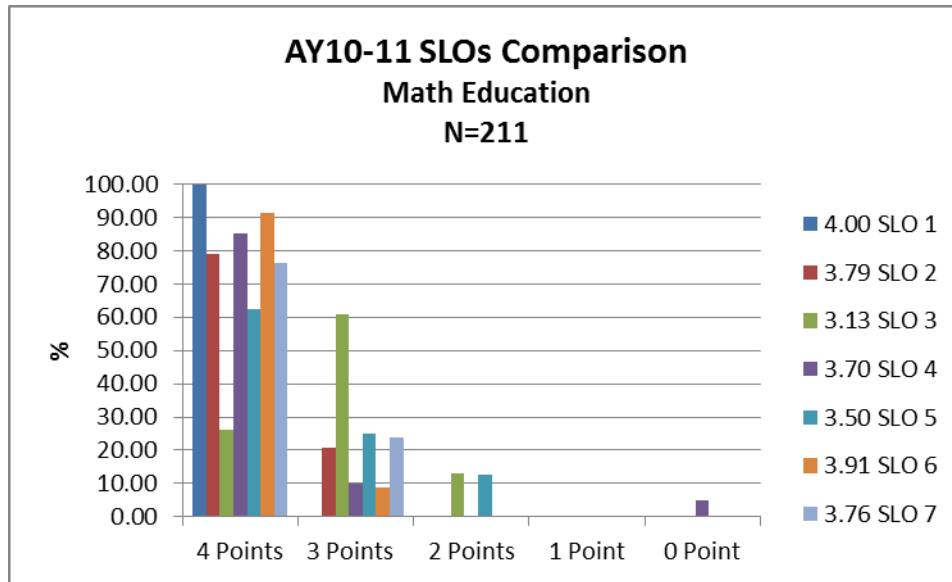
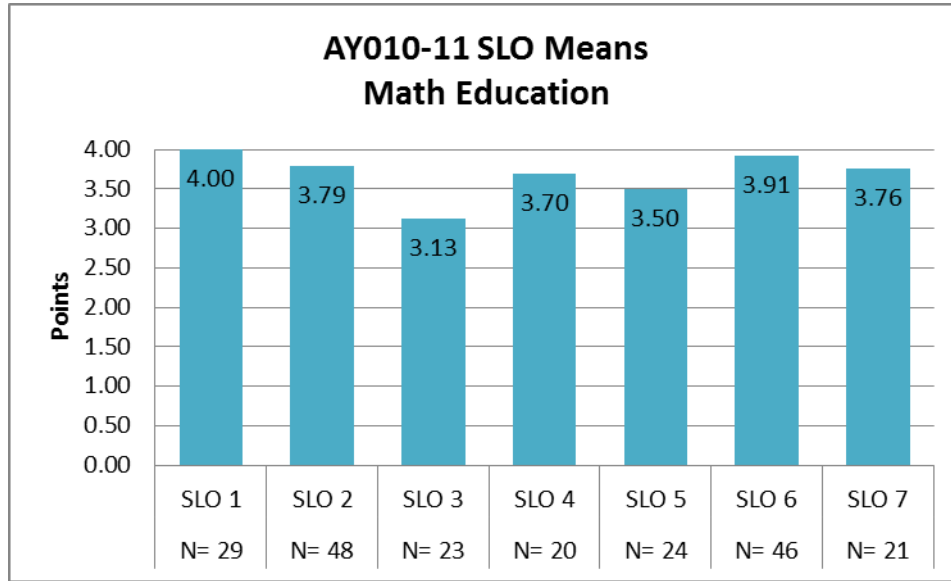


Figure 2 provides mean scores for each of the seven program SLOs. It shows SLO 1 has the highest mean scores at 4, followed by SLO 6, SLO 2, SLO 7, SLO 4, and SLO 5. SLO 3 has the lowest mean score at 3.13.

Figure 2

Math Education AY10-11 SLO Means



The following Figures 3 to 8 show the percentage of mean scores ranging from 0 to 4 points for each program SLO.

Figure 3 indicates that all students successfully described contemporary issues in mathematics education addressed in NCTM and California principles and standards. A total of 29 students scored at 4.

Outcome 1: Describe contemporary issues in mathematics education addressed in NCTM and California principles and standards.

Figure 3

Math Education AY10-11 Score Distribution-SLO 1

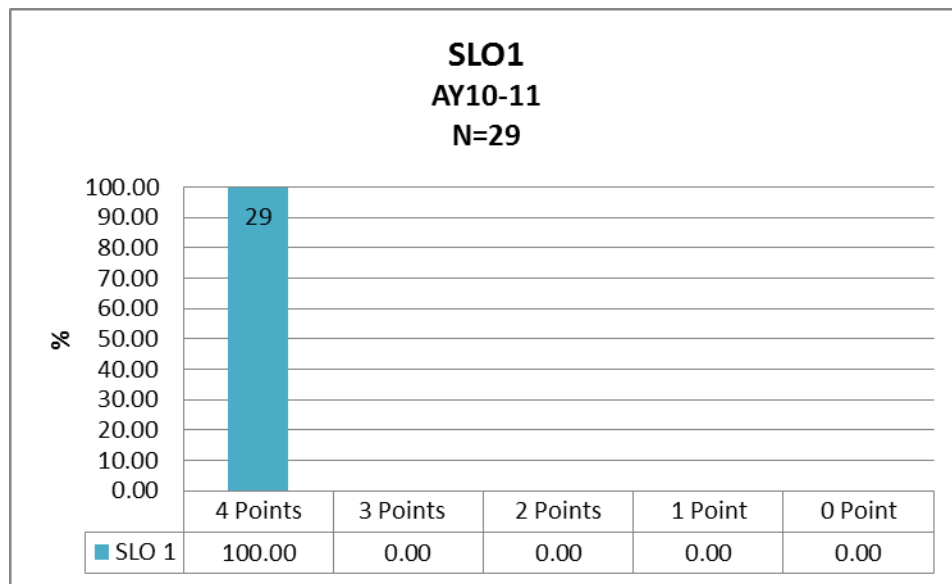


Figure 4 below shows that a total of 38 students scored a 4 on designing various assessments, interpreting, and using assessment results for planning and teaching mathematics. 10 students scored a 3 with the SLO2. The five criteria level data for SLO 2 is presented in Figure 5. 100% students achieved a level 4 proficiency on criteria 1 & 5; More than 98% of students achieved a level closed to 4 with criteria 3.

Outcome 2: Design various assessments, interpret, and use assessment results for planning and teaching mathematics.

Figure 4

Math Education AY10-11 Score Distribution-SLO 2

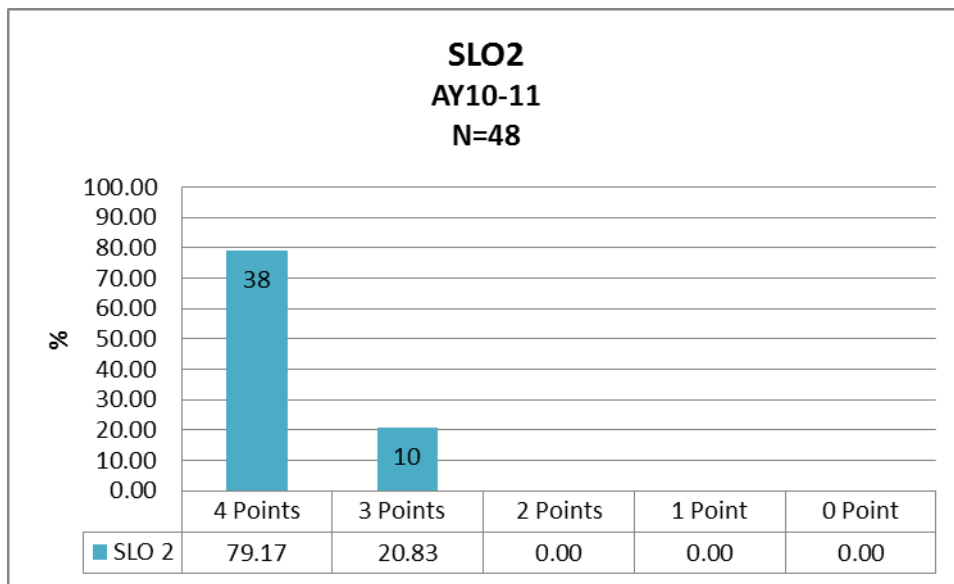


Figure 5

Math Education AY10-11 Criteria Means-SLO 2

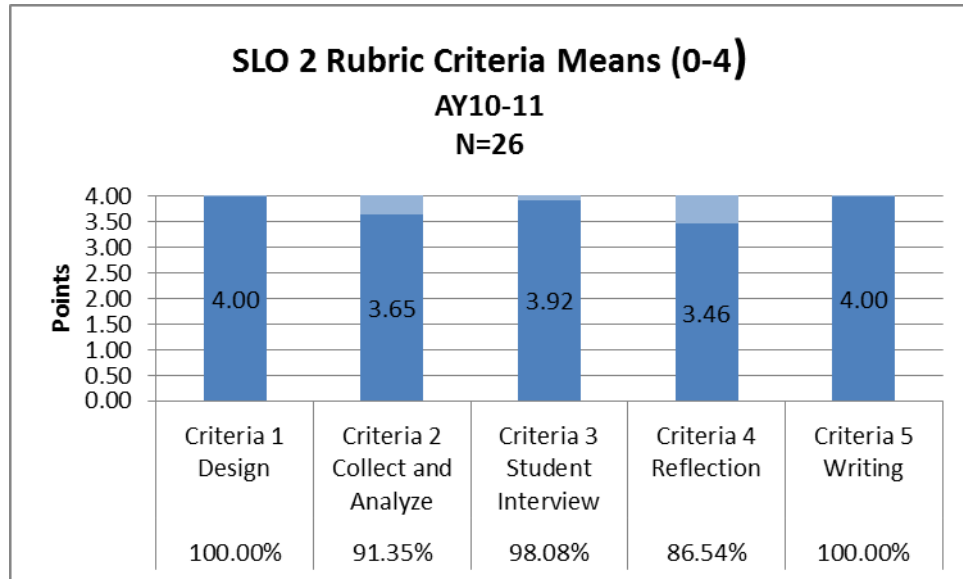
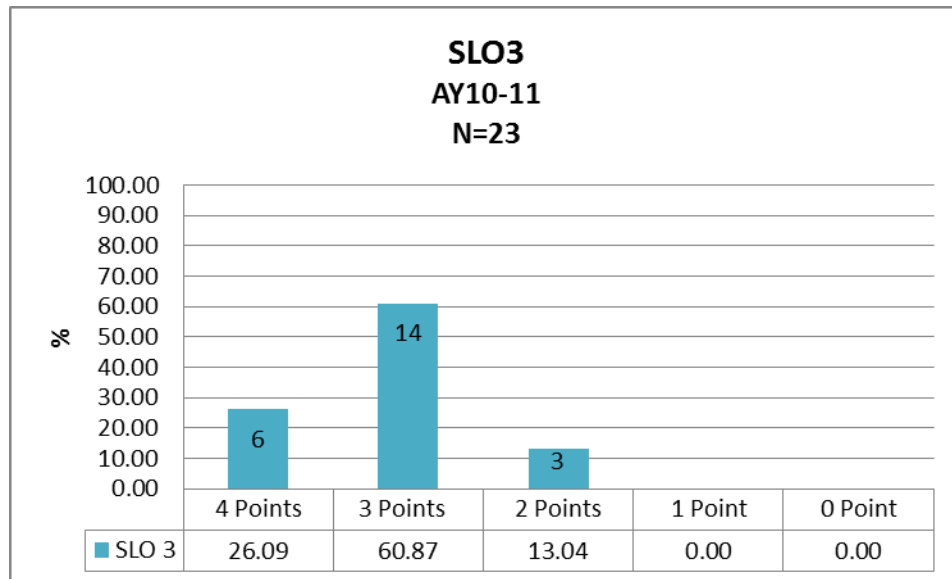


Figure 6 below shows that 26 % of students scored a 4 on applying research-based instructional strategies in teaching. About 61% of students had scored a 3 and 13% of students had scored a 2.

Outcome 3: Apply research-based instructional strategies in teaching.

Figure 6

Math Education AY10-11 Score Distribution-SLO 3



Results from Figure 7 show that 85 % of students scored a 4 on integrating contemporary technologies in mathematics planning, teaching, and assessment at the K-8 level; 10 % of students scored a 3 and 5% of students scored a 1 with the SLO 4.

Outcome 4: Integrate contemporary technologies in mathematics planning, teaching, and assessment at the K-8 level.

Figure 7

Math Education AY10-11 Score Distribution-SLO 4

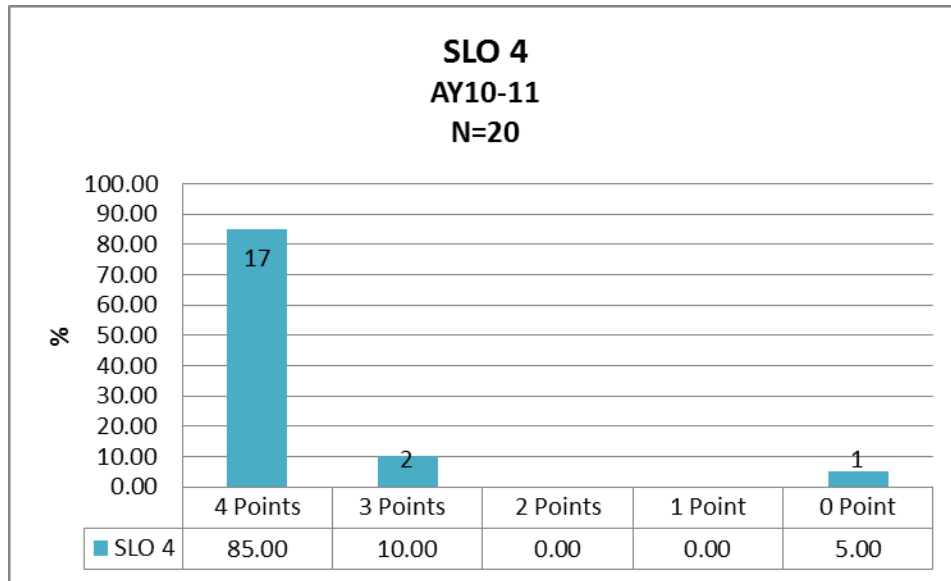


Figure 8 below indicates that about 63 % of students scored a 4 on Integrating pre-algebra and algebra content and pedagogy in K-8 classrooms; 25 % of students scored a 3 and about 13% of students scored a 2 with the SLO 5.

Outcome 5: Integrate pre-algebra and algebra content and pedagogy in K-8 classrooms.

Figure 8

Math Education AY10-11 Score Distribution-SLO 5

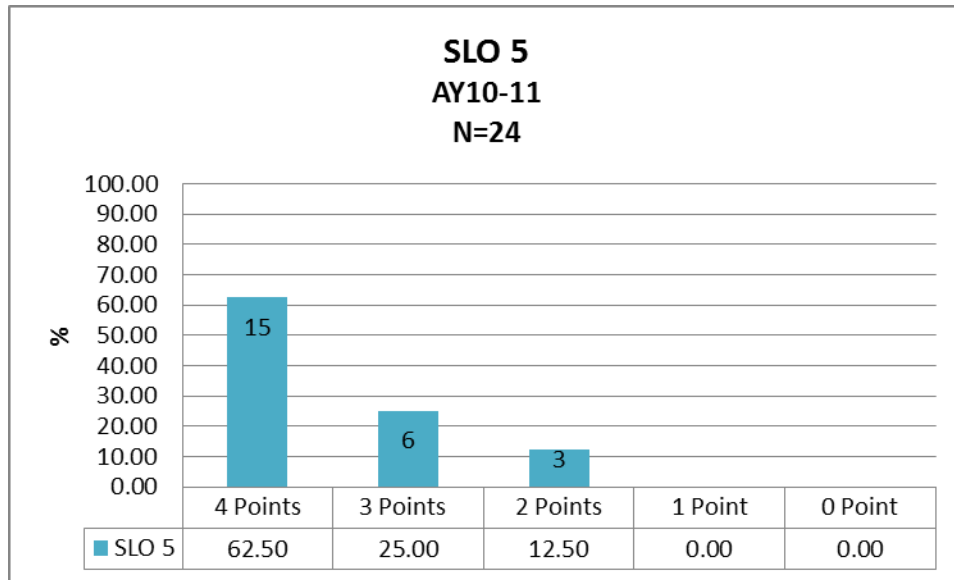


Figure 9 shows that more than 91% of students scored a 4 on designing research in their own teaching settings relating to mathematics education; only about 9 % of students had scored a 3 with the SLO 6.

Outcome 6: Design research in their own teaching settings relating to mathematics education.

Figure 9

Math Education AY10-11 Score Distribution-SLO 6

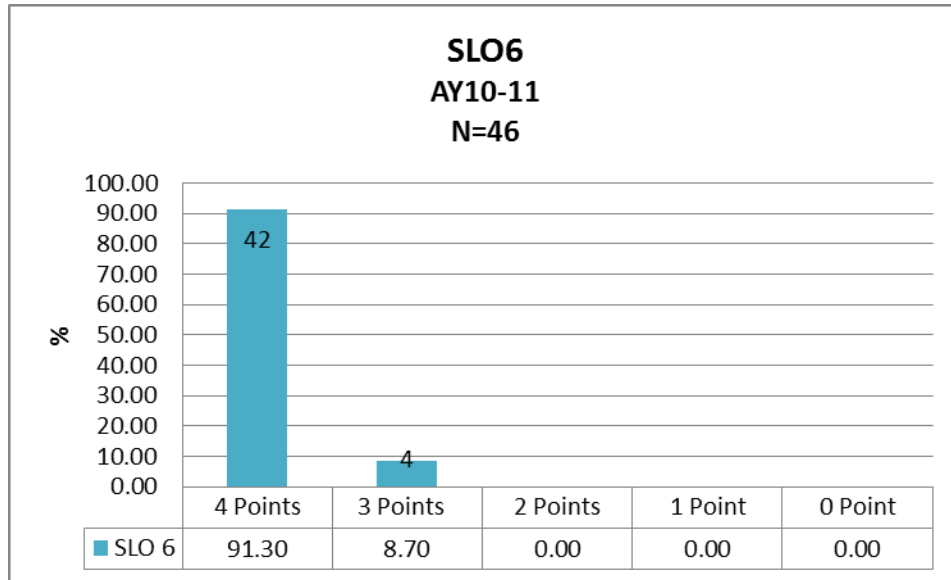
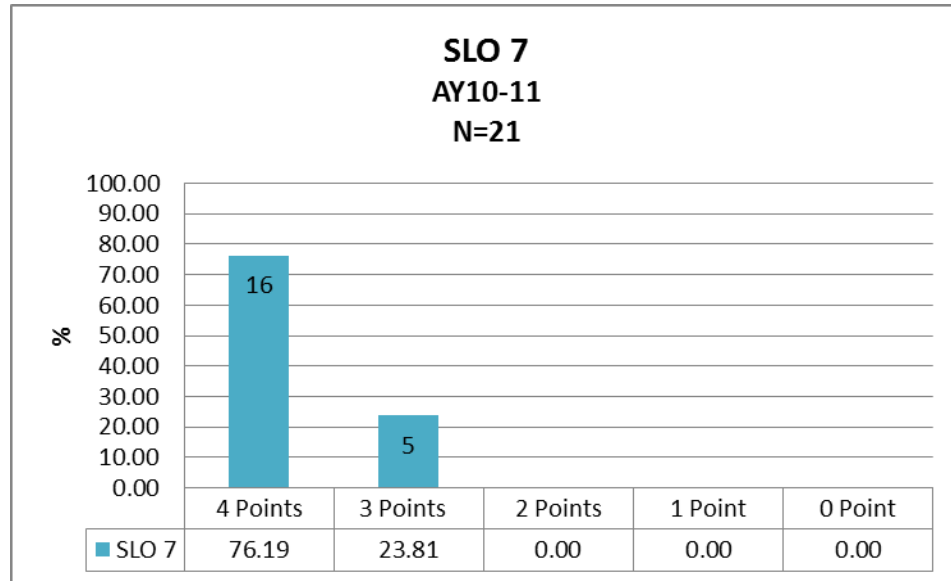


Figure 10 indicates that more than 76 % of students score a 4 on collecting, analyzing and interpreting data related to research question; about 24 % of students had scored a 3 with the SLO 7.

Outcome 7: Collect, analyze and interpret data related to research questions.

Figure 10

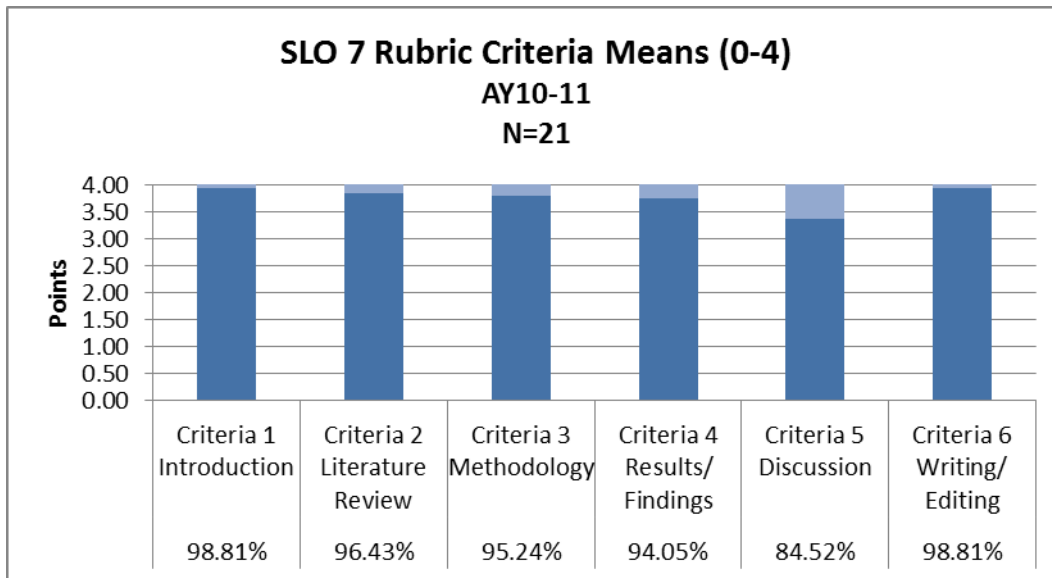
Math Education AY10-11 Score Distribution-SLO 7



The six criteria level data for SLO 7 is presented in Figure 11. Nearly all students achieved a level 4 proficiency on criteria 1 & 6; More than 95% of students performed well on criteria 2 and criteria 3 with closed score to 4 points; However, about 85% of students showed weakness on criteria 5 with their mean scores close to 3.5.

Figure 11

Math Education AY10-11 Criteria Means-SLO 7







- b. Program Effectiveness Data: What data were collected to determine program effectiveness and how (e.g., post-program surveys, employer feedback, focus groups, retention data)? This may be indirect evidence of student learning, satisfaction data, or other indicators or program effectiveness. Describe the process used for collection and analysis. Present descriptive statistics such as the range, median, mean, or summarized qualitative data, for each outcome.

In later spring 2011 a general Exit Survey by the College of Education was distributed to candidates in the last semester of the program coursework for the cohort 2009-2011. A total of five candidates responded to the survey, with 3 representing age range 50 above.

The results from the Exit Survey shows that all candidates indicated that their academic and professional work is enhanced by the use technology as a result of this program (see Figure 12 below).

Figure 12

14. Please indicate which of the following statements apply to you as a result of your program: (check all that apply)			
		Response Percent	Response Count
I am able to locate online resources in my field.		100.0%	5
I use technology ethically and responsibly (accessibility, fair use, security, safety, etc.).		100.0%	5
I am able to evaluate the reliability and quality of online resources.		80.0%	4
My academic and professional work is enhanced by the use of technology.		100.0%	5
answered question			5

Candidates in this program strongly believed the importance of promoting intellectual growth, personal growth, and interpersonal growth for all students/clients, and the importance of being a socially responsible leader and collaborating with the community (See Figure 13 below).

Figure 13

16. How important do you think it is to:					
	Very Important	Important	Somewhat Important	Not That Important	Response Count
promote intellectual growth for ALL students/clients?	100.0% (5)	0.0% (0)	0.0% (0)	0.0% (0)	5
promote personal growth for ALL students/clients?	100.0% (5)	0.0% (0)	0.0% (0)	0.0% (0)	5
promote interpersonal growth for ALL students/clients?	100.0% (5)	0.0% (0)	0.0% (0)	0.0% (0)	5
be a socially responsible leader?	100.0% (5)	0.0% (0)	0.0% (0)	0.0% (0)	5
value diversity among your students/clients?	80.0% (4)	20.0% (1)	0.0% (0)	0.0% (0)	5
collaborate with the community?	100.0% (5)	0.0% (0)	0.0% (0)	0.0% (0)	5
promote school or organizational improvement for all students/clients?	60.0% (3)	40.0% (2)	0.0% (0)	0.0% (0)	5
engage in research to inform your practice?	80.0% (4)	20.0% (1)	0.0% (0)	0.0% (0)	5
engage in ongoing evaluation of your practice?	80.0% (4)	20.0% (1)	0.0% (0)	0.0% (0)	5
answered question					5

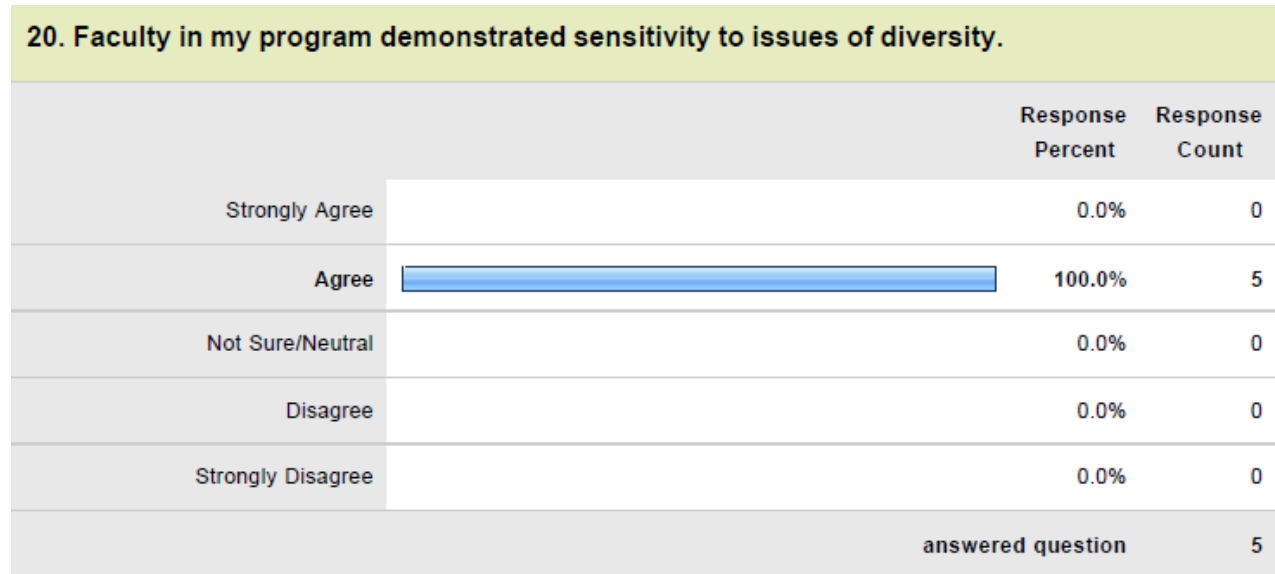
The majority of candidates indicated that the program greatly contributed to their ability to promote intellectual growth, personal growth, and interpersonal growth for all students/clients, to be a socially responsible leader, and to engage in ongoing evaluation of their practice. Especially, all candidates agreed that the program greatly contributed to their ability to engage in research to inform their practice (see Figure 14 below).

Figure 14

18. To what degree has your program contributed to your ability to:				
	A great deal	Somewhat	Not at all	Response Count
promote intellectual growth for ALL students/clients?	80.0% (4)	20.0% (1)	0.0% (0)	5
promote personal growth for ALL students/clients?	80.0% (4)	0.0% (0)	20.0% (1)	5
promote interpersonal growth for ALL students/clients?	80.0% (4)	0.0% (0)	20.0% (1)	5
be a socially responsible leader?	80.0% (4)	0.0% (0)	20.0% (1)	5
value diversity among your students/clients?	40.0% (2)	60.0% (3)	0.0% (0)	5
collaborate with the community?	20.0% (1)	80.0% (4)	0.0% (0)	5
promote school or organizational improvement for all students/clients?	60.0% (3)	20.0% (1)	20.0% (1)	5
engage in research to inform your practice?	100.0% (5)	0.0% (0)	0.0% (0)	5
engage in ongoing evaluation of your practice?	80.0% (4)	20.0% (1)	0.0% (0)	5
answered question				5

All candidates also agreed that faculty in the program demonstrated sensitivity to issues of diversity (see Figure 15 below).

Figure 15



Program Post-Survey

The program post-survey is used for the program to assess the effectiveness of course assignments, instruction, and student learning. The EDME program provided the program survey to the cohort 2009 – 2011 in spring 2011. 21 candidates responded the survey and results of the part 1 were shown in Table 7.

More than 90% of candidates indicated that the EDME program well prepared or highly prepared them to know their students’ math thinking and assess their math learning; and more than 90% of candidates rated highly that the EDME program well prepared or highly prepared their content knowledge and pedagogical content knowledge in teaching mathematics. In addition, more that 85% of candidates indicated that the EDME program well or highly contributed their knowledge on international perspective in math education, well prepared or highly prepared them to be math teacher leaders, and well prepared or highly prepared them to grow as future scholars. All 13 items had high responses on well or highly prepared choice (more than 80%). However, two areas had low responses than other items: preparation on integrating technology in teaching mathematics (52.4%) and preparation on teaching Special Ed or students with learning difficulties in math (62%).

Table 7*The Results of the EDME Program Survey*

Teacher Preparation	Not prepared	Poorly prepared	Adequately prepared	Well prepared	Highly prepared
How well do you feel the EDME program that you went through prepared you to plan math instruction?		9.2	14.3	38.1	38.1
How well do you feel the EDME program that you went through prepared you to teach mathematics?	4.7		19.1	38.1	38.1
How well do you feel the EDME program that you went through prepared you to know your students' math thinking and assess their math learning?			9.5	42.9	47.6
How well do you feel the EDME program that you went through prepared you to integrate technology in teaching mathematics?		14.3	33.3	33.3	19.1
How well do you feel the EDME program that you went through contribute to your knowledge on the international perspective in math education?			14.3	33.3	52.4
How well do you feel the EDME program that you went through prepared you to value diversity among your students?		4.7	14.3	38.1	42.9
How well do you feel the EDME program that you went through prepared you to teach ELL students?		4.7	19.1	38.1	38.1
How well do you feel the EDME program that you went through prepared you to teach Special Ed or students with learning difficulties in math		4.7	33.3	42.9	19.1
How well do you feel the EDME program that you went through prepared you to be a math teacher leader?			14.3	38.1	47.6
How well do you feel the EDME program that you went through prepared you to engage in research to inform your practice?			19.1	33.3	47.6
How well do you feel the EDME program that you went through prepared you to grow as a future scholar?			14.3	33.3	52.4
How would you rate your content knowledge in mathematics at your teaching level?			9.5	42.9	47.6
How would you rate your pedagogical content knowledge in teaching mathematics?			9.5	57.1	33.3

The part 2 of the program survey asked candidates to indicate the amount of their learning from each EDME course. Table 8 shows that more than 76% to 90.5% of responses indicated that they learned quite a bit or everything in most courses except EDME 505 course (47.6%).

Table 8

Learning from Individual Course

Learning from Each Course: Rate your learning from each course in the EDME program	Nothing	Very little	About half	Quite a bit	Everything
EDEL 599 Global Perspectives in Math Ed, Summer 2009	4.7		9.5	61.9	23.8
EDCI 580 Algebra: Research-based Pedagogy, Summer 2009			14.3	47.6	38.1
EDME 500 Contemporary Issues in Math Ed, Fall 2009			19.1	57.1	23.8
EDME 503 Advanced Methods in Teaching Math I, Fall 2009			19.1	46.6	33.3
EDME 501 Assessment in Teaching Math, Spring 2010	4.7	9.5	4.7	38.1	42.9
EDME 504 Advanced Methods in Teaching Math II, Spring 2010			23.8	38.1	38.1
EDME 502 Research in Math Teaching and Learning, Fall 2010			19.1	47.6	33.3
MTED 500 Advanced Perspectives of Foundational., Fall 2010		9.5	14.3	47.6	28.6
EDME 505 Technology in Teaching Math, Spring 2011		9.5	42.9	33.3	14.3
EDME 695 Seminar in Education, Spring 2011			9.5	52.4	38.1

Table 9 shows the results of the part 3 of the program survey. The results show students’ responses on the valuable and helpful assignments or projects from each course.

Table 9

Valuable and Helpful Work from Each Course

Courses	Please indicate the specific assignments or projects that were valuable and helpful to your teaching practice or professional growth
EDEL 599 Global Perspective s in Math Ed, Summer 2009	<ul style="list-style-type: none"> • Listening to other teachers was uplifting. Helpful because we got to talk to foreign teachers • Enjoyed leaning about China and meeting Chinese teacher and principals (using Elluminate to video conference). • Broaden teacher perspective in global sense. • Getting the opportunity to see Chinese schools and teachers was enlightening. Collaboration- the kind we should strive for.

<p>EDCI 580 Algebra: Research- based Pedagogy, Summer 2009</p>	<ul style="list-style-type: none"> Algebra Clinic: it served as a guide to analyze a specific lesson and view a student's math perspective. Algebra Clinic – Provided a vision for the differentiated instructions. Learned lots of approaches to tutoring Clinic was very useful because I got to work with a partner and learned much from her. Working with the students was very informative and gave a chance to experience working with a different age group.
<p>EDME 500 Contemporary Issues in Math Ed, Fall 2009</p>	<ul style="list-style-type: none"> Learning different multicultural perspectives and where and how certain math concepts came from around the world. Literature Review: served as a first step to thinking on math research project. We experienced math games and activities from around the world Listening to other teachers report on current issues was quite helpful. Learned about bias and political issues
<p>EDME 503 Advanced Methods in Teaching Math I, Fall 2009</p>	<ul style="list-style-type: none"> I enjoyed reading and learning about MSA chapters that Dr. An and Dr. Wu wrote. I learned to write a literature review Enhancing student dispositions of math learning – Learning how to improve students' dispositions Discovered many approaches to teaching Lesson Reflection: opportunity to work with other teachers and reflect on one of our lessons; helps to improve teaching.
<p>EDME 501 Assessment in Teaching Math, Spring 2010</p>	<ul style="list-style-type: none"> Learn to create and analyze and interpret student assessment Action Research on Assessments – Learned how to conduct the action research using assessment tools Action Research: gave me the opportunity to talk to students and see what they were doing wrong; helped me target any misunderstandings or conceptions of a specific problem. Creating our own assessments was quite powerful. I learned how important and difficult it is to create a test that actually assesses the concept taught.
<p>EDME 504 Advanced Methods in Teaching Math II, Spring 2010</p>	<ul style="list-style-type: none"> I learned to design and carry out case studies Learned practical and effective teaching Learning Models: see and use different models to target a specific lesson; focus on one makes you an expert in at least one model. Illuminate meeting – Provided a great opportunity to communicate and share the lesson ideas from the teachers in other countries. The lesson study was helpful. Watching other teachers' videos as a group and then discussing them was great insight. Worked together as grade level and made a math unit. Learned from each other and our self through videotaping.
<p>EDME 502 Research in Math Teaching and Learning, Fall 2010</p>	<ul style="list-style-type: none"> I learned to write a research proposal Disposition Paper: gave me the opportunity to work with SPSS; served as a guide for when I wrote the research paper. Data analyzing and interpretations The article critiques helped make sense literature reviews.
<p>MTED 500 Advanced Perspectives of Foundation</p>	<ul style="list-style-type: none"> I learned to write a mathematics research paper and a few math concepts. Final Project: helped investigate math content and become an expert in it. Strategies to enhance mathematical thinking Research Paper - Research paper assignment guided me to completely explore the areas I was interested in – The Golden Ratio (Fibonacci Sequence)

al., Fall 2010	
EDME 505 Technology in Teaching Math, Spring 2011	<ul style="list-style-type: none"> • Learning how to make the webquest. Discovered new way of integrating technology (internet) in the classroom, and for projects. Found the useful website and made me look for games I could use in computer lab with students. • Webquest – Learned how to use technology for my teaching • Updated teaching using technology • Creating and testing the effectiveness of a Web Quest was beneficial. • 2nd life, logo not useful for elementary students because of computers needed and type of activities.
EDME 695 Seminar in Education, Spring 2011	<ul style="list-style-type: none"> • I learned to write a multi chapter research paper that included methods, data gathering and analysis and interpretation. • Research Paper: it helped target an area of concern and find research and methods that could help students in that specific area. • Action Research “Music Integrated Math Learning” – Learned the entire process of conducting the action research • I learned a lot about analyzing data and how to word a research paper.

The part 4 of the program survey asked candidates to answer the question “What do you like most about the EDME program? Why?” Table 10 shows the results of responses from 20 candidates: Eight candidates indicates that they like most about the action research project that guided them to grow professionally; five candidates agreed that they had great experience in working with others; three liked most on analyzing and learning teaching methods and student thinking; two liked most about their professors’ support; one liked most about the international perspectives from this program.

Table 10

Program Survey 2009-2011

	What do you like most about the EDME Program? Why?
1	I like the learning process with an inclusive cohort. Colleagues are very friendly and helping each other’s out. Moreover, we learn and share our experience in teaching to help us improving our teaching in the future.
2	Excellent
3	MSA Model
4	Action Research – Guided me to grow professionally by performing every process of research project
5	I grew as a researcher in this program. When I have my own classroom, I will probably analyze how effective I am as a teacher and find ways to better my effectiveness.
6	I enjoyed all the professors guiding us through the process. I learned from their expertise throughout the program. A special thanks to Dr. An that was very patient with all of us.
7	Working and learning from peers
8	The whole program was great. I enjoyed learning about different research studies done in the past and being able to do my own.
9	<ul style="list-style-type: none"> • sense of community • teacher support • open communication and collaboration between peers • depth of material covered
10	Good research component. Good introduction to learning from overseas models. Research project put it

	all together.
11	Student thinking and error analysis Action research. Writing up the action research. APA training was good. Researching and reviewing literature was great.
12	Made wonderful friendships. Working with the international community at the China conference was an extraordinary experience.
13	The action research project and the MTED 500 course.
14	The action research project and the ability to guide our own research and make our own choices about assessment and data.
15	I really enjoyed learning new ideas, lessons, and strategies from my classmates. I also appreciated how accessible my professors were.
16	I learned presentation strategies and techniques in addition to learning about research methods and the writing process.
17	Assignments that dealt with looking closely at your students – analyze and critique own way of teaching. Lesson Plan Presentations – saw a variety of methods for teaching different content.
18	Great experience in working with others. Everyone seems to change a lot during the two years that we were together.
19	I liked working collaboratively with my colleague on parental involvement. We worked well together, and integrated our strengths in completing our research.
20	Work with my colleagues (lesson unit) in various group assignment

4. OPTIONAL: You may provide additional information (e.g., other data, copies of letters of support from granting agencies or school staff, etc.) about candidate performance, the student experience or program effectiveness used to inform programmatic decision making. This may include quantitative and qualitative data sources.

Program Impact

Scholarly Activity

The unique feature of the EDME program is focusing on supporting candidates to grow scholarly and professionally with global perspectives. Each year, a number of candidates present their research and lesson study with our EDME faculty at state, national, and international conferences.

In spring 2010, we engaged our candidates from EDME 504 in attending the Elluminate online meetings on Classroom Teaching Research for All Students (CTRAS). They learned ideas about effective teaching strategies and data collection and analysis methods with colleagues from different universities in five countries. The graduate students from EDME 502 also participated in this international research group's Elluminate meetings in fall 2010. As the results of our graduate students' participation in the CTRAS, seven graduates from the EDME program - Rosa Campos, Cristina Cortez, Min Young Kim, Jennifer Kolb, Lazaro, Alberto, Anastasia Lee, and Joseph Russo attended and presented their research on algebra teaching at the 13th International Conference on Mathematics Education in Hangzhou, China. Rosa Campos, a classroom teacher from IUSD, Jennifer Kolb, elementary teacher from LBUSD were also invited to teach Pythagorean Theorem (by Rosa Campos), and Integers (by Jennifer Kolb) open lessons to Chinese children, followed by Chinese colleagues to teach the same topics at Sino-US Advanced Forum on Primary School Math Education in Beijing. Chinese colleagues were amazed at Rosa and Jennifer's excellent creative teaching and all participants highly commented about their teaching, compared to Chinese teachers' lessons. As the results, Jennifer's Integer's Lesson was accepted by the journal of Elementary Mathematics Teaching in China, and her proposal assignment at EDME 504, "Closing the Achievement Gap: From Stress to Success!" was accepted by California Mathematics

Council (CMC)-South Annual Mathematics Conference 2010 in fall 2010. Again, in summer 2011, Min Young Kim, Lynda McCoy, and Toby Carpenter traveled to China with the EDME faculty and co-presented their research on teaching algebra with our faculty at the Third International Classroom Teaching Research for All Students (CTRAS) Conference in Changshu, China.

Our graduates also actively involved in scholarly work with scholars from other universities. For example, Anastasia Lee co-presented her study with scholars from Texas A&M University, entitled, "Teaching Geometry through Music Instrument Making and Designing" at the 2011 annual meeting of the National Council of Teachers of Mathematics in Indianapolis, IN. Min Young co-presented her study entitled, "Implementation of Music-Math Integrated Lessons in Elementary School Classes" at the 2011 annual conference of School Science and Mathematics Association in Colorado Springs, CO.

In fall 2011, 10 graduates from the cohort 2010-2012 presented their learning experience from the East Meets West Program at the National Conference of NAAPAE. Elsie Rivera, Jill Parago, and Vicki Hou presented "East meets West : Equivalent Fractions for English Language Learners"; Diana Acosta, Toby Carpenter, Caroline Park, and

Eric Frommholz presented "East Meets West : Teaching Mathematics Using a Real World Connection in the Dual Language Setting"; Belva D Serrano, Lynda McCoy, and Francisco Gi presented, "East Meets West : Hands-on Activities in the Classroom of Mathematics."

East Meets West

This program started in summer 2009 and was developed in 2010. In summer 2009, candidates from EDME 550 interacted with Chinese top ranking math teachers from Nanjing and discussed how to teach math effectively via Elluminate online meetings. In fall 2009, candidates from EDME 503 class shared video math lessons with classroom teachers in Beijing, China, and discussed and critiqued their lessons via Elluminate meetings.

In summer 2011, the East Meets West Program was established by CSULB and local school teachers. The goal of the East Meets West program is to make an international experience accessible to our graduates in the EDME program through integrating a graduate course EDME 550 *Global Perspectives in Mathematics Teaching* into a Summer Teacher Institute that provides a unique opportunity for our candidates to work with children from both Chinese and U.S. groups in a dual language immersion setting. About 32 graduate students, 11 school teachers, 20 CSULB student volunteers, and 40 children from US and 42 children from China have benefited from the East Meets West program since summer 2010. This program engages our graduate students (K-8 classroom teachers) in an interactive face-to-face learning process: Learning effective teaching strategies from Chinese top ranked mathematics teachers and applying these strategies in teaching mathematics by working with a group of Chinese and U.S. children. Our graduates had opportunities to be involved in planning and organizing activities, working with children, observing math lessons taught by Chinese teachers and interacting with them. The graduate students also did a case study on comparing student learning, and designed and taught a series of hands-on, fun, innovative, and interactive math lessons to both Chinese and U.S. children. In addition, they evaluated their peers' instruction by providing constructive feedback for each lesson. As a result, 10 graduates presented their learning experience from the East Meets West Program at the National Conference of NAAPAE in fall 2011.

Overall, this program has provided our graduate students an experiential challenge on how to best help ELL students in the learning of math and provided them a great field work experience while working with ELL students in an effective way. It also broadened our students' views on how different cultures

and educational systems teach math in a different way and connected the CSULB with local and international communities (see Appendix B: Teacher Education Newsletter Fall 2010).

The preliminary data analysis from the post-survey of EDME 505 in summer 2011 reveals student significant learning. Here are some of the highlights:

Knowledge and skills:

Table 11 shows that 100% of graduates indicated that watching Chinese math video lessons and discussing these lessons benefited them as classroom teachers ; 94% confirmed their learning form the observation of Chinese teacher’s math lesson; 92% believed that teaching to the two groups of children benefit them as classroom teachers. All graduates liked the observation of their peers’ six math lesson. Overall, 93% of the graduates recognized that their participation in the East Meets West events benefit them as classroom teachers.

Table 11

Graduate Student Survey Results

Questions	Very Helpful (%)	Helpful (%)	Not sure (%)	Not helpful (%)	Never helpful (%)
How did the observation of Ms. Jin’s math lesson and discussion benefit you as a classroom teacher?	88	6			
How did the observation of your US colleagues’ six math lesson and discussion benefit you as a classroom teacher?	96	4			
How did watching Chinese math video lessons and discussion these lessons benefit you as a classroom teacher?	100				
How did your teaching to the two groups of children benefit you as a classroom teacher?	88	4	1		
How did your participation in the East Meets West events benefit you as a classroom teacher?	88	5			

Overall, as indicated by our graduate students in their reflection, “the East Meets West learning experience for the graduate students, the Chinese students, and the U.S. students was an opportunity of a lifetime. All of us are walking with a much appreciation of each other and their cultural values.”

Analysis and Actions

5. What do the data for each outcome say regarding candidate performance and program effectiveness? Please note particular areas of strength or in need of improvement.

SLO and Exit Survey Data Analysis

Overall, the SLO data from all seven courses reveal that a majority of candidates performed above level 3 in their signature assignments. Students’ performance was particularly well on SLO 1 – Describe

contemporary issues in mathematics education addressed in NCTM and California principles and standards, SLO 6 –Design research in their own teaching settings relating to mathematics education, SLO2 – Design various assessments, interpret, and use assessment results for planning and teaching mathematics, SLO 7 – Collect, analyze and interpret data related to research questions, and SLO4 - Integrate contemporary technologies in mathematics planning, teaching, and assessment at the K-8 level.

The Exit Survey reveals that the EDME program has developed candidates’ productive dispositions on the importance of promoting intellectual growth, personal growth, and interpersonal growth for all students/clients, and the importance of being a socially responsible leader and collaborating with the community (see Figure 13). In addition, the program greatly contributed to their ability to promote intellectual growth, personal growth, and interpersonal growth for all students/clients, to be socially responsible leaders, and to engage in ongoing evaluation of their practice. Especially, the program greatly contributed to their ability to engage in research to inform their practice (see Figure 14). Furthermore, the Exit Survey reveals that the faculty in the program demonstrated sensitivity to issues of diversity (see Figure 1) and they strongly felt satisfied with using technology in this program (see Figure 12).

The outcomes of the SLO data show that students seem to be struggling on SLO 3 - Apply research-based instructional strategies in teaching. The challenge of this SLO requires candidates to engage a long learning process of the math lesson study throughout the semester by developing a series of unit lesson plans collectively with their grade level peers and videotaping two lessons of their teaching. Not only do they need to watch and reflect their teaching, but also to provide feedback to their peers’ video lessons and to share their learning experience at their math department meetings. For candidates who do not have classrooms or cannot get approval for videotaping their lessons, they need to get help from their peers and thus taking a long time to complete their signature assignment. However, candidates learned a great deal from this lesson study, as they indicated in their Program Survey, part 3, “The lesson study was helpful. Watching other teachers’ videos as a group and then discussing them was great insight. Worked together as grade level and made a math unit. Learned from each other and our self through videotaping.”

The surprising finding is the result of Question 14 on the Exit Survey that indicates all candidates felt satisfied with using technology in this program, which is consistent with the results of SLO 4 (see Figure 7). The candidates described the valuable and helpful learning to their teaching practice or professional growth from EDME 505 (see Table 9):

- Learning how to make the webquest. Discovered new way of integrating technology (internet) in the classroom, and for projects. Found the useful website and made me look for games I could use in computer lab with students.
- Updated teaching using technology
- Creating and testing the effectiveness of a Web Quest was beneficial.

However, a few candidates suggested providing technology course at the beginning of the two years, instead of at the end of the second year. Currently, we integrate the technology course. EDME 505 with their action research project in their last semester. Candidates learn technology skills in the most sessions, but they need to devote some of their efforts and times to their final action research project.

The areas of particular concern where we would like to see student performance improve are SLO3 and SLO7. In EDME 504 course, candidates not only need to work on the lesson study (SLO3), but also have

heavy workload on other projects because we start to prepare students for their final action research project in EDME 504. We need to reduce workload for EDME 504 course and reduce two video lessons to one video lesson in SLO3. With SLO7, Criteria 5 – Chapter 5 Discussion for the action research report, more support is needed to help students on writing chapter 5.

Program Survey

The program post-survey for the cohort 2009 – 2011 in spring 2011 confirms most findings from the Exit Survey and Data Results. It reveals that candidates agreed they had received successful preparation by the EDME program (see Program Survey, Part 1). They indicated that the EDME program well prepared or highly prepared them to know their students' math thinking and assess their math learning, and the program not only well prepared or highly prepared their pedagogical content knowledge in teaching mathematics, but also their content knowledge. In addition, candidates indicated that the EDME program well or highly contributed their knowledge on international perspective in math education, well prepared or highly prepared them to be math teacher leaders and to grow as future scholars.

However, two areas had low responses than other items in the program survey, part 1: preparation on integrating technology in teaching mathematics (52.4%) and preparation on teaching Special Ed or students with learning difficulties in math (62%). We will modify the some assignments, add practical technology skills, and provide some lectures in real classroom at a local school in EDME 505. For the preparation on teaching Special Ed or students with learning difficulties in math, we will make effort to ensure all candidates are aware explicitly that the Math Clinic project in EDME 520 is the RTI Tier 3, focusing on providing interventions to individual Special Ed or struggling students. Collaborating with EDP graduates, they teach their clients who are struggling in math for eight intervention sessions and produce a thick field report including diagnostic test, analysis strengths and weaknesses, design interventions, log and reflection for each session, post-test, progress monitoring chart, analysis effects of their teaching strategies, and parent report.

6. How do these findings compare to past assessment findings?

Since this is our first annual report, it is difficult to compare

7. What steps, if any, will be taken with regard to curriculum, programs, practices, assessment processes, etc. based on these findings in Questions 5 and 6? Please link proposed changes to data discussed in Q5.

Action Plan

Priority	Action or Proposed Changes To Be Made	By Whom?	By When?
1	Add practical technology skills that are practical and accessible by classroom math teachers in EDME 505; provide some lectures in real classroom at a local school to connect their learning to real teaching practice; use webquest to design individual website and link candidates' school website; reduce Net Log learning.	Zhonghe Wu	Spring 2012
2	Reduce workload for EDME 504 and have students focus more on the signature assignment	Shuhua An Marina Krause	Fall 2012
3	Provide more support to students on how to write Chapter 5 – Discussion of Action Research Report by showing more sample chapter from the previous cohort and inviting former students to share their writing in EDME 695.	Shuhua An	Spring 2012 Spring 2014
	Explicitly make all candidates aware that they learn and develop teaching strategies for Special Ed or students with learning difficulties in the Math Clinic project in EDME 520. Add another Tier 2 project in EDME 503 or 504.	Shuhua An	Spring 2011 – EDME 503; Spring 2012 – EDME 503

Data Discussion
Mathematics Education program
Minutes

12:00 -2:00 pm, November 15, 2011
ED1-1

Participants: Shuhua An, Ella Burnett, and Zhonghe Wu

1. Reviewed the results of the data and Exit Survey for the EDME program
2. Reviewed all SLOs
3. Review the data on the overall scores and subscores of the SLOs
4. Reviewed the signature assignment/rubric
5. Discussed the strengths and needs of the EDME program
6. Discussed the next steps and action

Data Analysis and Interpretation Discussion

Student Learning

- How satisfied are you with the overall performance of students on the signature assignment?

Very satisfied with student overall performance on the signature assignment considering this was the first cohort doing the signature assignments.

- On what criteria or sub-skills do students seem to be doing *particularly well*?

Outcome 1: Describe contemporary issues in mathematics education addressed in NCTM and California principles and standards.

Outcome 2: Design various assessments, interpret, and use assessment results for planning and teaching mathematics.

Outcome 4: Integrate contemporary technologies in mathematics planning, teaching, and assessment at the K-8 level.

- On what criteria or sub-skills do students seem to be *struggling*?

Outcome 3: Apply research-based instructional strategies in teaching.

- What about the results was surprising?

All candidates felt satisfied with using technology in this program (see results of Question 14 on the Exit Survey). We integrated the technology course EDME 505 with their action research project in their last semester. Candidates need to devote some of their times to the action research project.

- How do findings on this outcome compare to past results on the outcome?

N/A

- What are the areas of particular concern where you would like to see student performance improve?
1. SLO3 - Apply research-based instructional strategies in teaching. Students had heavy workload in this class because we also prepared students for their final action research project. We need to reduce workload for EDME 504 course.
 2. SOL7, Criteria 5 – Chapter 5 Discussion for the action research report. Provide more support to students on how to write chapter 5.

Instrument Utility

- Did the signature assignment and/or rubric you used give you the information you were seeking?
Yes
- Do you want to make any revisions to the signature assignment and/or rubric, or the assessment process?
Yes, we plan to make a change on the signature assignment for SLO3.

Programs, Courses, and Practices

- What do other data (such as program indicators) say related to your results? (For instance, how do they confirm, contradict, or add to what the direct evidence of student learning suggests?)

The EDME program survey confirmed the most findings from the Exit Survey and Data Results. Although not all candidates did not feel strongly about the preparation of integrate technology in teaching mathematics from the EDME Program Survey, they indicated on the Exit that their academic professional work is enhanced by the use of technology.

- What actions (e.g., policy or curricular changes, faculty development, additional courses or extracurricular opportunities, changes in processes) might you take to improve student learning?
1. Although students suggested having EDME 505 at the beginning of the program instead of at the end of the second year, it is difficult to make that change due to their needs more help for the action research project. We will focus on the technology skills that are used in their teaching instead of teaching new technology that may be difficult, not be practical in teaching practice.
 2. about 85% of students showed weakness on criteria 5 with their mean scores close to 3.5.
 - 3.
- Who else needs to know about these findings and next steps?
All faculty members in the Mathematics Education at the College of Education.

Closing the Loop and Moving Ahead

Priority	Action or Proposed Changes To Be Made	By Whom?	By When?
1	Change practical technology skills in EDME 505	Zhonghe Wu	Spring 2012

Priority	Action or Proposed Changes To Be Made	By Whom?	By When?
2	Reduce workload for EDME 504 and have students focus more on the signature assignment	Shuhua An	Fall 2012
3	Provide more support to students on how to write Chapter 5 – Discussion of Action Research Report.	Shuhua An	Spring 2012 Spring 2014