



Ohio Higher Education Mathematics Steering Committee – Meeting Minutes

November 15, 2013 10:00-3:00

Ohio Board of Regents B-004

This was the fourth meeting of the Ohio Higher Education Mathematics Steering Committee. Present were:

- Committee members: Linda Chamblin, Paddy Dowling, Joan Leitzel, Krista Maxson, David Meel, Ricardo Moena, Rodney Null, Carl Stitz, Andrew Tonge, Michelle Younker, and Jeff Zeager.
- Ex-officio members: Cathy Chudzinski, Bruce Johnson, Randy Smith, Mike Snider
- Ohio Board of Regents staff: Carlos Bing, Michelle Blaney, Paula Compton, Stephanie McCann, Brett Visger, Hideo Tsuchida
- Dana Center Staff: Jenna Cullinane, Philip Uri Treisman (via telephone)

I. Welcome and Introductions

Dr. Joan Leitzel opened the meeting and thanked everyone for the work that has been done to date. Mr. Rodney Null was recognized for receiving the [AMATYC Teaching Excellence Award](#). This award from the American Mathematical Association of Two-Year Colleges is intended for educators who have made outstanding contributions to mathematics or mathematics education at a two-year college. This prestigious award is granted in odd-numbered years. Two of the four recipients this year are in Ohio. The other recipient is Mr. Ed Gallo at Sinclair Community College. This information will be placed on the website.

Dr. Uri Treisman attended the meeting via conference call. He was grateful that Ms. Jenna Cullinane was able to attend in person. Ms. Cullinane thanked the steering committee members for the fantastic work they all did completing the templates. Participants in the room then introduced themselves.

A question was raised regarding clarity and compliance with the Uniform Standards for Remediation Free Status for a score of 22 on the ACT. A score of 22 assures that a student can take a credit bearing course. The lack of clarity pertains to whether the credit bearing course must pertain to or be the first mathematics course in the degree program. Mr. Null and Dr. Jeff Zeager will document the question with specific scenarios detailing potential student dilemmas and send to Dr. Paula Compton.

After the last meeting Ms. Cullinane developed a bulleted list of the meeting highlights. Dr. Leitzel asked if the steering committee found this helpful. The committee agreed that it was helpful. Ms. Cullinane will create a new list for this meeting and also send to Ms. Michelle Blaney to assist with the meeting minutes.

Dr. Leitzel proceeded with an overview of the meeting agenda. Dr. Treisman and Ms. Cullinane will begin with a summary of the components to remind everyone of the work that has been completed and what still needs to be accomplished. Afterward, the steering committee will divide into small groups to address two important tasks.

The next meeting of the Mathematics Higher Education Steering Committee is December 13, 2013.

II. Approval of October 4, 2013 Meeting Minutes

- Dr. Leitzel asked for approval of the meeting minutes, and the group approved the minutes with one suggested edit that Ms. Cullinane will email to Ms. Blaney after the meeting.

III. Review of Template Results

Ms. Cullinane began by thanking everyone for the time spent on template completion. To facilitate the discussion of template information, Ms. Cullinane synthesized the steering committee's comments into groups that were displayed in a PowerPoint presentation. The steering committee groups should let Ms. Cullinane know if anything crucial was eliminated during the synthesis process. Ms. Cullinane proceeded to discuss the big ideas and drivers for each template component allowing 20 minutes to work on each component. Next the small groups considered missing items, areas for improvement, and priorities. The small groups reported back to the larger group after each 5 minute discussion.

Essential Component One

Revisit the traditional college algebra and other entry-level courses and get a measure of how well they work as:

- a) A gateway to the major in mathematics,
- b) a gateway to other mathematics-intensive majors, and
- c) as a supportive course for majors that are not mathematics-intensive.

Consider alternative entry-level courses. In what manner can mathematics departments work with other departments on the alignment of mathematics courses to programs of study?

The problems	Drivers of the problem (things that keep us from meeting the aim)
Degree completion is low.	<ul style="list-style-type: none"> • High failure rates in math courses • Students' limited math skills • Students' limited problem-solving skills • Students' limited college success skills • Inadequate student support systems

<p>Entry-level math courses are not aligned to all programs of study.</p>	<ul style="list-style-type: none"> • Major requirements not based on assessment of essential knowledge and skills • College algebra used as general math requirement • College algebra perceived as keeping major options open • Insufficient communication between math and other departments on campuses about essential mathematics needs in those departments
<p>There is a lack of uniformity across institutions about which courses are considered college level and what skills are needed to indicate readiness for different entry-level courses.</p>	<ul style="list-style-type: none"> • All courses in the OTM have intermediate algebra as a pre-requisite but not all entry-level courses require intermediate algebra skills • Need for a clear, uniform mechanism to define what Ohio institutions mean by college readiness
<p>Alternative to intermediate and college algebra may not be covered under current statewide transfer agreements.</p>	<ul style="list-style-type: none"> • Existing OTM makes innovation difficult • Faculty beliefs about different kinds of mathematical thinking that are necessary for students • Need to understand the changing mathematical needs of other disciplines

Report Outs for Essential Component One

Group One

- What is a college level mathematics course? This definition will be needed before moving forward.
- Which skills should students have? Based upon the necessary skills, direct students into courses that best suit those needs.
- Why is Intermediate Algebra there?
- The importance of transfer, especially to 2 year institutions, must be kept in mind.

Group 2

- The connection to 1a “a gateway to the major in mathematics” is not clear.
- How can courses be aligned for students who have not chosen a program of study?
- There is a need to account for two types of freshman students. Those who come in undecided and sample various courses and those who are confident of a program of study at the beginning, but change majors after a few semesters.

Group 3

- Should the institution hold responsibility for providing support structures and making sure students are aware?
- Dr. Treisman referenced two data sources. One from David Rousseau and another from the [UCLA Higher Education Research Institute](#). He also added a few additional points from the research:
 - There are big shifts in student understanding between courses and plans.
 - Engineering and Physical Sciences are no longer the primary users of mathematics. One half of all women who take calculus are preparing for fields in the Biological Sciences.

Group 4

- What is meant by college readiness?
- Is there a cadre of mathematics content that should distinguish a person as being college level? To illustrate, a person with a diploma should be able to figure out a car payment.

Group 5

- With counselors being generally risk adverse, college algebra is perceived as keeping entry options open.
- What are some of the options for alternatives? An example was provided of a general education quantitative literacy course that was marked pending during OTM review. Prerequisites are usually defined locally, but this is not the case for transfer. How should the panels determine a college level course? This topic prompted additional discussion from the larger group:
 - Dr. Carl Stitz added that college readiness is a topic that needs discussion. A student could be ready for statistics, but not for algebra.
 - Ms. Linda Chamblin added that we do not know if college algebra is still being overused as it was in the past.
 - Dr. Treisman indicated that caution needs to be taken. This work will have an important signaling role within K-12. If institutions of higher education move to different pathways, high schools should prepare students broadly for all of them and not just narrowly for one.
 - Mr. Null mentioned the potential for advising issues for students who begin planning for a 2 year track versus students who mention a 4 year track and start taking college algebra.

Essential Component Two

Review current transfer models and processes for obtaining transfer approval, with goals to include ensuring the applicability of new/existing courses to majors and programs of study, and providing

uniform standards while permitting course innovation. Consider issues such as student learning outcomes, prerequisite courses, required credit hours, and the infrastructure for approving courses

The problems	Drivers of the problem (things that keep us from meeting the aim)
Mathematics courses in the OTM are outdated and do not reflect the present educational reality and goals of the State of Ohio. The structure of the OTM is restrictive and does not allow for innovation.	<ul style="list-style-type: none"> • OTM review panels not structured to respond to changing goals • Course acceptance based narrowly on lists of objectives, credit, and prerequisites • Course evaluation not focused on big ideas of courses • Intermediate algebra arbitrarily considered as a benchmark for college readiness • Restrictive credit hour requirements
It is difficult to ensure quality and consistency of courses.	<ul style="list-style-type: none"> • Syllabi and textbooks inadequate measure of course quality • No current mechanisms for assuring course depth and rigor

Report Outs for Essential Component Two

Group One

- Where did Algebra II originate?
- The general mathematics elective needs to be revamped to align with the Common Core
- The OTM Mathematics Panel will need retraining
- There may be a need for more panel reviewers.
- The original model is that all reviewers will review each course.
- Course submissions need to be entered into the Course Equivalency Management System (CEMS) by a content expert.

Group Two

- The Common Core standards can provide a starting point for determining college level.

Group Three

- Should intermediate algebra be considered a uniform, default benchmark for all?
- Need to consider the models and processes for transfer.
- Variation between the institutions in meeting the approved learning outcomes is also part of the problem.

Group Four

- The word “arbitrary” should be removed.
- Syllabi and textbooks are inadequate measures of course quality.

Group Five

- When courses are transferred is important. Student performance decreases with longer time spans between courses. How long should a student have to transfer a course before expiration?

Essential Component Three

Develop strategies to familiarize departments, instructors, and advisors with alternative approaches to entry-level courses, inclusive of content, instruction, and delivery mechanisms. Develop communication mechanisms that provide for exchange of information among chairpersons about best practices and about ways to move promising efforts to scale. Develop strategies to communicate the recommendations of the Ohio Mathematics Steering Committee to relevant professional associations, state decision-makers, university and college leaders, and other relevant stakeholders.

The problems	Drivers of the problem (things that keep us from meeting the aim)
Mathematics faculty and advisors rarely communicate across institutions about matters of common concern (e.g., alternate pathways, pedagogical experiments).	<ul style="list-style-type: none"> • Lack of infrastructure for timely, meaningful cross-institution communication • Lack of information about which communication methods are most effective for various stakeholder groups • Determining which pathways best serve which majors still a work in progress
Personnel in mathematics departments are mostly unaware of state-level requirements and recommendations regarding mathematics education.	<ul style="list-style-type: none"> • Faculty primarily focused on local, not state problems • Weak communication within institutions between administrators and faculty and support staff • Confusion about curriculum requirements of various accreditation bodies
Personnel who have regular, direct interaction with students do not have deep knowledge and understanding of alternative math pathways.	<ul style="list-style-type: none"> • Infrequent connections between some math departments and non-math departments to discuss the challenges students are facing • Lack of deep understanding by many faculty about how math is used in various career fields

Report Outs for Essential Component Three

Overall, the groups approved of the content with a few additional comments:

- The timeliness of communication from OBR to provosts and downward needs improvement.
- There is potential for disagreement with the recommendations.
- There is a need to address the differences between professional and disciplinary advisors. To illustrate, professional advisors may not be fond of mathematics. Disciplinary advisors may not be familiar with the degree requirements.
- There is a need to be more specific. Communication should include program directors and managers.
- There is an underutilization of existing communication structures on the campuses. There should be more proactive communication between mathematics faculty and others on the campuses.

Essential Component Four

Develop mechanisms for collecting and analyzing data to measure effectiveness of existing and new entry-level mathematics courses, including dual enrollment courses taught in the high schools. Establish calendars for monitoring student success over time and for the periodic review of policies and practices.

The problems	Drivers of the problem (things that keep us from meeting the aim)
There is no common definition of “effectiveness” of entry-level college mathematics courses.	<ul style="list-style-type: none"> • Different constituencies trying to solve different problems (i.e. graduation rates, course rigor) • Resistance to transparency and perceived threats to autonomy • Missions and student populations differ by institution
There are inadequate institutional research frameworks for measures of effectiveness that can be used for improvement of courses and course sequences.	<ul style="list-style-type: none"> • Institutional research offices often compliance-oriented, capacity-constrained • Data to improve courses and sequences is a new demand on IR • Political sensitivity of data • Lack of knowledge about which pathways are best for which students
There is no trigger or schedule for periodic course review, especially dual enrollment courses.	<ul style="list-style-type: none"> • No demand for this previously • Money, how to pay for data collection and analysis • Tension between rapid results and time needed to track students from admissions to completion

Data are lacking at all levels to measure effectiveness, including student performance in subsequent courses, unique features of delivery, pedagogy used in innovative approaches, and important non-academic factors.	<ul style="list-style-type: none"> • Lots of new experimentation, lack of identified metrics for measuring effectiveness. Is it what we are teaching? How? Who? • Inconsistent definition of effectiveness of dual enrollment courses
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Report Outs for Essential Component Four

There were a few comments from the groups on Essential Component Four:

- What perspective of effectiveness would be used to collect data? Effectiveness can mean many different things to different people.
- Support will be needed from the state for getting data sets and completing research.
- Would it be possible to gather data from department chairs on success rates? Dr. Stephanie McCann will address the research questions later in the meeting.

Essential Component Five

Look for ways to improve alignment with K-12, specifically to ensure that college-level and developmental-level mathematics courses reflect the secondary-level CCSSM and to ensure that dual enrollment courses in any setting are equivalent to taking the course on a college campus. Delineate the roles of mathematics departments in supporting secondary schools as they prepare students to be college ready and without a need for remediation.

The problems	Drivers of the problem (things that keep us from meeting the aim)
Mathematics pathways from high school to college are not aligned to current or future entry-level mathematics courses.	<ul style="list-style-type: none"> • Misalignment of content, especially non-algebra intensive college courses • Misalignment of rigor and deep learning of mathematical concepts • Misalignment of pacing • Misalignment of the responsibility of students for learning • Lack of indicators for students about whether they are prepared to succeed in college math courses • Successful completion of a prior high school course inadequate measure of readiness for college courses
Placement into college courses is very problematic. ACT scores are not a good measure of a student's knowledge of mathematics in standard freshman courses.	<ul style="list-style-type: none"> • Placement misaligned to new courses • Single assessments produce too many false negatives and positives • No direct signal to high schools about the impact of curriculum on college success

Communication between high school and college teachers needs to become habit.	<ul style="list-style-type: none"> • Insufficient opportunities for more, better, and respectful communications • Unwillingness, insecurity, and blame among some high school and college teachers
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Report Outs for Essential Component Five

Group One

- Some institutions don't have placement and instead use ACT, COMPASS, ACCUPLACER, ALEKS to do placement. There are issues with placement testing overall.
 - Dr. Jeff Zeager commented that the ACT by state law is almost being used as a placement test.
 - Mr. Brett Visger responded that the remediation free standards are not the same as placement. The standards simply create a floor. Institutions have a great degree of freedom regarding placement.
 - Dr. Leitzel mentioned some potential remediation options: Co-remediation, JIT remediation, and a course + remediation component.
 - Dr. Treisman mentioned that remediation is currently receiving attention in many states. There is movement to increase supports for remediation. It will be important in the solutions phase to make recommendations. The Dana Center has resources on placement that will be shared with the steering committee.

Group Two

- Sometimes there is no communication between institutions and K-12 regarding dual enrollment.
 - May wish to provide communication strategies
 - The deals that are crafted do not always suit the student.
 - The measure that should be followed is "success in the following course."

Group Three

- Under communication strategies, our purpose is to prepare students for what comes next.
- Higher education faculty are not always familiar with the content and practice of Common Core.

Group Four

- Dual enrollment done well is a benefit to students. Dual enrollment done poorly is very, very bad for students. It is important to ensure that dual enrollment is done correctly.

- How do the Uniform Standards for Remediation Free Status dovetail across institutions? Better communication is necessary.

IV. Lunch

The steering committee took a half hour break from Noon-12:30 for lunch.

V. Small Group Discussion

After lunch, Dr. Leitzel provided instructions for the steering committee to work in break out groups. The goal of the groups was to begin generating strategies to address the problems discussed earlier in the meeting. Once the strategies were generated, the groups were to think through the strategies to find the mechanism for improvement, while keeping the bigger picture in mind and looking for the ideas and strategies that might solve multiple issues.

VI. Report Out for Small Groups: Committee Responses

Once the groups returned to the conference room, the reports were given from each group following the order of Groups 4,2,5,1,3.

Group Four

The Group 4 discussion began with what types of data they would like to see. These included:

- The success/pass rate in the subsequent course
- Correlation between the grades in the 1st and 2nd courses
- Student persistence or progress in college

Dr. McCann indicated that OBR would be able to provide data on the success/pass rate and correlation between the 1st and 2nd course grades.

Group 4 moved on to discuss a number of different ideas which included:

- Additional documents that could be submitted with OTM submissions
 - A copy of the final exam
 - A sample of A work, B work, and C work
 - Perhaps the submissions should be on a 3-year cycle. Particularly for courses where data indicates areas of concern
- State certification for mathematics instructors
 - This topic raised additional questions on who would decide hires, the potential for tensions, and to whom a certification would apply (high school instructors, adjunct faculty, etc.)
- The guidelines for dual enrollment from OBR
 - Problems could be resolved with clear guidelines
 - The need for state level oversight of dual enrollment
 - Who is eligible to be an adjunct?

Dr. Paula Compton reminded the steering committee that OBR serves as a coordinating board rather than a governing board. Ms. Cullinane posited a question concerning when students are taking their mathematics courses.

Group Two

- Data are needed on the effectiveness of transfer. These data will need to be accumulated over time. We do not have the information today.
- The mathematics panel could begin finding new ways to look at learning outcomes rather than guidelines. Revision is needed.
- There is a desire to increase the number of courses in the OTM. There is also a desire to decrease an alarming DFW rate.
- Perhaps a community can be built at two levels: mathematicians statewide and mathematics faculty with the campus as a whole.
 - Dr. Leitzel questioned how this could happen and who might do the work.
 - Dr. Ricardo Moena responded that more faculty need to be involved.
 - Ms. Cathy Chudzinski suggested getting the lead faculty from the summit involved in the discussion.
 - Dr. Krista Maxson suggested getting on the agenda at regional MAA meetings. She volunteered to talk with Dr. Phil Blau.

Group Five

- Data are needed on the impact of dual enrollment
- Also need data concerning coming out of standard high school courses with certain grades.
 - This is data we do not have.
 - Dr. Treisman sent a link on dual enrollment to Dr. Leitzel, Ms. Cullinane, and Dr. Compton. Many systems of dual enrollment assume a static system that is not changing. The resource link has good templates, as long as change is kept in mind.
 - A joint discussion should occur between high school and college concerning the 4th year high school course and first year college course.

Group One

- What options are there for a gateway course?
- Research is needed on how students are placed in college algebra.
 - Why is a particular student there?
 - What is the advising?
- The communication piece will be crucial in finding what is in the best educational interests of students.
- A support course could be developed for majors that are mathematics intensive. Such as using mathematics to support science courses and making it relevant to the student.

- Dr. Treisman commented that advisors generally have very little content on students and little knowledge of mathematics.
 - An online self-placement tool might be useful for students to complete before visiting an advisor. Data can be collected to ensure students get the right information.
 - Are there other instruments that can be adapted?

Group Three

- Discussion should occur at the chairs meeting to determine which avenues of communication would work best.
- The steering committee should get involved with groups across the state as a continued presence providing guidelines, addressing issues, and sharing best practices.
- An electronic clearinghouse of best practices and implementation strategies would be useful.
- OBR should be involved for their influence and connections.
- The steering committee needs to take an inventory of who is involved with which groups. The connections of the group all put together may be quite rich.

Additional Discussion

- Dr. Compton asked the group if they feel empowered to make the changes that are needed.
 - Time on the task would be needed.
- Who makes the final decision for OTM changes?
 - Need committed participants.
 - Need to develop a timeframe.
- Dr. Leitzel commented that we are more prone to react to decisions made by others than taking the lead and anticipating the changes that should be made. This steering committee represents the discipline of mathematics. It is imperative to have a strategy to reposition decision making on mathematics.
- Ms. Cullinane added that some of the concerns are the perception of barriers and some are actual barriers.
- A concern was raised that some colleges are knowingly accepting credit from non-qualified dual enrollment instructors. Dr. Compton replied that these concerns should be raised so OBR may provide assistance when possible.
- Dr. Zeager asked what changes are off the table?
 - Dr. Leitzel replied that everything is on the table. If a barrier is encountered, it will be examined and a decision is to be made. The strategy should be framed as deciding what needs to be done and encountering barriers during that work, rather than starting with the barriers in mind.
- Dr. Andrew Tonge added that an atmosphere of appreciation for mathematics needs to be fostered at the highest levels in institutions. Messages will need to come from both the departments and the provosts.

- Dr. Leitzel added that we need to educate the public for the future generations on the importance of mathematics.
 - 40 billion earth-like planets have been discovered. Kepler used a mathematical model for his accomplishment. He was not just looking around randomly.
 - Statistics are now needed to even read a newspaper effectively.
 - Mathematics and life sciences have joined together.
 - The public needs to understand that everyone must and can learn some mathematics.
 - It is not clear even at our own institutions that mathematics should be part of the core.
- Dr. Leitzel began talking about the final report.
 - Samples of other reports will be needed for the December meeting.
 - Mr. Don VanMeter, a communication strategist, may be hired to assist with the report.
 - The task of the steering committee is to develop the substance of the report, not the style.
 - Ms. Cullinane suggested reviewing the report from Georgia.
- Ms. Cullinane reminded everyone that a new template will be received via email on Monday for linking the problems to the solutions. Each group should submit their responses by December 2, 2013.

VII. Questions Answered by Research

Dr. McCann presented broad information on the types of data that are collected in HEI. This includes data about all students in all classes for:

- Subject
- Completion rates
- Passing the subsequent course
- When students take mathematics
- Pass rates
- Grades since 2011

The main research challenge will be gathering information from those who work with institutional research on the gateway course and the subsequent course. Mathematics subject codes for courses after the gateway course are needed. Also site information is needed for dual enrollment students in mathematics courses.

A few additional points were raised:

- Some students are taking PSEO A, PSEO B, high school, and college classes at the same time. Dr. McCann will check to see if the school district can be determined.
- OBR is currently working with ODE on connecting information. In the future it will be possible to see more connectivity between high school and college.
- Existing data show whether a course is developmental, but not the level.

- Is there information on ACT score and mathematics success? OBR stopped receiving ACT data 2 years ago. There is work being done to start receiving the data again.
- Dr. Leitzel mentioned a research study she did at OSU on students from 1976-1980 on improving school to university articulation in Ohio.
 - The research found that the highest level students graduated or were seniors at a rate of approximately 80% after four years. Students at the lowest level graduated or were seniors at a rate of approximately 10%. 50% of the lowest level students were still ranked as freshmen.
- Ms. Cullinane mentioned other studies showing that tenacious students tend to perform well. There are also correlations between yoga and mathematics, and music and mathematics.

VIII. November 14th Meeting with OATN Advisory Council

Dr. Leitzel provided an overview of the presentation she gave yesterday for the Ohio Articulation and Transfer Network Advisory Council. She was present at the meeting, as well as Ms. Michelle Younker and Ms. Cathy Chudzinski. The Advisory Council was very interested in the work being done by the steering committee. Questions were asked of Dr. Leitzel on the following topics:

- Will remedial mathematics be fixed?
- What is the involvement of institutions that do not have representatives on the steering committee?
 - Dr. Leitzel discussed the upcoming mathematics chairs meeting.
 - She also explained that steering committee members are also communicating back to their institutions and getting feedback.
- Dr. Leitzel will be presenting to the Ohio Articulation and Transfer Network Oversight Board on December 2, 2013.
- Dr. Leitzel will also be participating in a break out session for the student completion plan on December 5, 2013. She asked Mr. Visger to provide a short report on this conference at the December steering committee meeting.

Additional Information

Dr. Leitzel discussed two additional resources that have been added to the resource list posted on the Ohio Mathematics Initiative website. These two resources are:

- [The History of the Undergraduate Program in Mathematics in the United States](#)
- [The Calculus Concept Inventory – Measure of the Effect of Teaching Methodology in Mathematics.](#)

IX. Reflections

Dr. Treisman added the following reflections:

- **Connections:** The work of the steering committee is surrounded by parallel efforts in the mathematics field, such as the Ingenious Project (by SIAM, AMA...) and AMATYC, which suggest college algebra should not be the only general education mathematics course and that intermediate algebra should not be the only prerequisite course for entry-level mathematics courses.
- **Influence:** As individuals we have more or less influence, but collectively we can have great influence on the field. Documents, such as our final report, will increase our collective authority, as well as, lend credibility to individual concerns.
- **Data:** We need to be using data much more often to inform system decision-making, student-level decision-making, and to extend the capacity of under resourced stakeholders in our colleges, for example advisors.

X. Next Steps

Dr. Compton shared the next steps:

- The homework template is due Monday, December 2, 2013
- One template should be submitted per group
- Ms. Cullinane will do a summary of the template responses

Additional activities include:

- Preparations are beginning for the retreat, including the development of an agenda.
- OBR will work with OSU on sending an invitation out for the mathematics chairs meeting.
- An update will be sent out to provosts about initiative progress and the chairs meeting.
- The college and university presidents need to be kept informed.
- Add Dr. Treisman and Ms. Cullinane to the steering committee listserv.