Notes from Science Discipline Workgroup Meeting #1 July 20, 2007

Hillary Fuhrman welcomed everyone and introduced Missouri Department of Higher Education (MDHE) staff present.

Ms. Fuhrman proceeded with the rest of the introductions and then presented the goals for the meeting following the slide on p. 3.

Today's Goals

Particular attention was paid to:

1) The context of the current discussion on curriculum alignment.
2) The urgent need for this work to be done:
    a. Need to address the tremendous gap between K-12 and higher education
    b. 35% - 40% of postsecondary students in Missouri need remedial work
3) The overall vision for these meetings is for faculty (the experts) to communicate how to reduce this percentage.
4) The importance of collective decision-making for this process

It was emphasized that those present were in charge as they were the experts in their field. The MDHE staff was simply there as facilitators to help the group focus and define their next steps. One of the necessary outcomes for this meeting was the selection of two representatives to serve on a Steering Committee.

National Curriculum Alignment

"Curriculum Alignment" is a "nebulous phrase" that is played out across two areas:

1) Secondary to Postsecondary Alignment
2) Postsecondary Course Alignment

Resources were passed around for those present to look at and discuss later. (See Resources Handout)

"Secondary to Postsecondary Alignment" is of particular concern as the expectations between secondary and postsecondary educators are so vastly different. Secondary curricula do not necessarily lead to postsecondary success, even though 90% of students profess interest in continuing on to postsecondary education. It was mentioned that the State Board of Education revised standards last year which led to the coordinating Board of Higher Education (CBHE) revising the 42 hour General Education Block.

Assessment was described as being a sort of gatekeeper between secondary and postsecondary education. MODEC and placement tests were discussed as examples. The wide range of scores that were acceptable by various postsecondary institutions made preparation for these tests problematic. Students do not currently have a clear message as to what they need to do to prepare for college.

The discussion was turned towards concerns with "Postsecondary Course Alignment". Paramount concerns were:

1) Differences between course numberings and standards
2) Differences between institutional missions, goals, and related standards

Resources aimed at correcting these differences were passed around. These included examples of state initiatives from Colorado and Illinois as well as The American Math Association of Two Year Colleges (AMATYC). Some of the better state-level alignment work involves course competencies, outcomes, and contents. Much of this work has been mandated by state law. In Missouri, the Department of Economic Development has been working hand-in-hand with the Department of Elementary and Secondary Education (DESE) and MDHE to maximize the value of student learning to insure the future of the state's economy.

National Context/Drivers

On a national level, much of curriculum alignment has been driven by No Child Left Behind (NCLB) and the Spellings Report "A Test of Leadership: Charting the Future of U.S. Higher Education." The Spellings Report has promised that it is not another NCLB for higher education. Instead, it is focused on increasing accountability, affordability, and accessibility to postsecondary education. In order to do this, the Higher Learning Commission has been working on accreditation and assessment issues. They are particularly concerned with assessing student learning outcomes and discerning the real value of what students actually learn.

Historical Curriculum Alignment in Missouri

The Missouri K-16 Coalition was formed in the mid-90s to coordinate alignment from secondary to postsecondary education. It was driven by administrators and was not very inclusive of faculty involvement or knowledge.

In 2005, a General Education Policy and Matrix were developed. As part of this, credit transfer guidelines were created to facilitate transfer among Missouri higher education institutions. This project was again primarily administrator-driven. The results were broad and its applicable courses were left up to the individual institutions.

DESE has been revising Grade Level Expectations (GLEs) from 2000 through the present because of NCLB. They are now moving more towards end of course evaluations (or Course Level Expectations, CLEs) that would potentially compose anywhere from 10-20% of a student's grade. These evaluations would replace the MAP. They need to roll out the first of these exams by the 08-09 school year. These exams have been created primarily with input from secondary educators, with very little input from persons in higher education. Discussion ensued regarding the impact these exams could potentially have on curriculum. Particular concern was raised that the chemistry exam had become more of a physical science exam because of the need for widespread implementation and funding restrictions. Concerns were also raised about the impact these exams would have on perceptions regarding college readiness.

MoDEC entry level competencies were also mentioned. The work done with this is going to be considered as a good starting point. It is again, imperative, that faculty is involved with whatever competencies/assessments are created next. DESE's "Grade and Course Level Expectations" was also referred to. It was reiterated that all students that graduate from high school should have at least the same level of general competencies – whether they plan on going on to postsecondary education or into the workforce. The Department of Economic Development has also been pushing for this as the vast majority of jobs in the state are on their way to becoming knowledge-based. This shift in the economic sector means that for state citizens to be employed, they will need to have the same competencies as their peers who continue into postsecondary education. It is becoming increasingly difficult for those without some sort of higher education to be able to find decent jobs. Traditionally, high schools have not been geared towards either track. Dual credit courses have also been problematic.

Current Missouri Drivers

Of particular importance to the current discussion is the Math, Engineering, Technology, and Sciences Coalition, or the "Missouri METS Coalition". This coalition is concerned with the future of Missouri's economic development. A summit last year included leaders in the business world who delivered recommendations to Governor Blunt. These recommendations focused on the need to improve curriculum alignment across the board in these subjects. They recommended that such alignment be particularly focused on math as this subject was often the gatekeeper to engineering, technology, and the sciences. These recommendations, in part, led to Senate Bill 580 and the creation of the P-20 Council. This council involves the Missouri Department of Higher Education (MDHE), the Coordinating Board of Higher Education (CBHE), the Department of Elementary and Secondary Education (DESE), and the Department of Economic Development (DED). DESE has made a particular commitment to align with MDHE. Thus the work that will be done in these meetings will inform the work that DESE does.

The recently passed Senate Bill 389 is the catalyst that drives this specific project on curriculum alignment. Section 173.005 states that

> *The coordinating board shall establish guidelines to promote and facilitate the transfer of students between institutions of higher education within the state* ***and shall ensure that as of the 2008-2009 academic year, in order to receive increases in state appropriations, all approved public two- and four-year public institutions shall work with the commissioner of higher education to establish agreed-upon competencies for all entry-level collegiate courses in English, mathematics, foreign language, sciences, and social sciences associated with an institution's general education core and that the coordinating board shall establish policies and procedures to ensure such courses are accepted in transfer among public institutions and treated as equivalent to similar courses at the receiving institutions. The department of elementary and secondary education shall align such competencies with the assessments found in section 160.518, RSMo, and successor assessments****;***

Of particular concern is the need for alignment between DESE and MDHE. At this time, 35% of students in Missouri higher education have to take remedial courses. This is cause for significant concern. These courses do not offer college credit and cost the state significant amounts of money. Those who must take these courses have a far lower chance of ever completing an undergraduate degree. Of course, these statistics vary by the selectivity of an institution. For example, at a highly selective institution, students who would typically be placed in a remedial course are offered other solutions, such as tutoring, that are not tracked in the same way. There is no data on how many of the 35% are typical 18-year-olds or are instead more non-traditional students who may have been far away from an educational setting for any number of years.

Curriculum Alignment Organizational Structure

Senate Bill 389 mandated the creation of faculty-based discipline workgroups covering mathematics, sciences, English, social sciences, and foreign languages. The METS coalition has led the MDHE to develop a discipline workgroup in engineering and technology. The MDHE has also decided to create a discipline workgroup in the humanities so that all major disciplines are included.

After these faculty-based workgroups have met and determined the scope of the work to be done, two members from each workgroup will become a part of an over-arching steering committee. This steering committee will be composed of faculty members, administrators, and MDHE staff. While the official charge of this steering committee has not yet been developed, one of their primary goals will be to coordinate the efforts of the various discipline workgroups and to compile documents and recommendations for the MDHE Commissioner to present to the CBHE. The work of the discipline workgroups and the steering committee will not be tied to a concrete timeline until a better understanding of the scope of the work to be done is gained.

Vision

One of the key purposes of this meeting is for the faculty to tell the MDHE what their vision is. What is it that faculty would like the MDHE to "charge you with" (to give you a political mandate for)? The vision of the MDHE for these meetings is to

1) smooth transitions from secondary into postsecondary education (lower remediation rates) and
2) to smooth transitions amongst higher education institutions for those who do not finish the 42 hour general education block or those who go through transfer "swirl" or concurrent enrollment.

The decision of what course(s) to include as "entry-level' for a typical college freshman is up to participants in these discipline workgroups, particularly the knowledgeable faculty, to decide. At this point, it may be helpful to discuss what curriculum alignment is and is not:

Curriculum alignment today is an opportunity to influence public policy. Curriculum alignment is not a road to across-the-board assessment. The goal here is to realize and to

demonstrate that local autonomies can work well together with the goal of accountability in higher education.

Some of the information that state legislators receive is anecdotal and may or may not be in tune with what is going on at state institutions of higher education. This is an opportunity for us all stakeholders more aware of what is actually going on with the state's higher education institutions. It is an opportunity for us to have a say in determining and creating public policy. The MDHE staff is here to serve you and to help you achieve your goals. It is up to you to decide how detailed or how broad the core competencies are.

It was reiterated that we need to continue to raise rigor and to pull DESE up towards our standards. The workgroup broke for a working lunch during which members discussed the direction of the workgroup.

After lunch, discussion resumed on the entry-level and exit-level competencies.

The workgroup discussed the need for better math skills of entering students and determined that the entry-level competencies would also include some "habits of mind" competencies (i.e. critical thinking skills).

The workgroup then discussed which courses would be selected for the development of the entry/exit competencies. There was concern raised as to whether the course competencies were directed to majors or non-majors. It was determined that this was up to the faculty to decide, but that focus needed to be on the "typical" college student pathway into college.

Concern was also raised regarding what assessment projects this work would lead to. The MDHE assured participants that these workgroups are not geared towards creating blanket state-wide assessment tools. The purpose of this work is to send a more unified message to secondary schools and potential college students about what would make their experience in postsecondary education more successful. It is intended that decisions regarding assessment will be left to the discretion of individual institutions.

Participants were concerned that there was no representative of geology present. Further work will involve locating appropriate representation of this discipline.

In discussions of how poorly prepared students were for college work, three concerns were repeatedly raised: the general lack of mathematical knowledge among them, their poor study and thinking skills, and the lack of properly educated and paid science teachers in the secondary system. While the scope of these meetings does not allow for the revolution of the secondary system and surrounding culture that many of the faculty would like, there were some aspects that they could have a say in via these curriculum alignment meetings. It was determined that stronger basic math skills were something that definitely needed to be encouraged. In the section on science competencies set forth in *College Knowledge* (see Resources page), twenty-nine of these competencies are math-

related. It was unanimously agreed that basic math skills were the one thing that secondary institutions needed to focus on more. It was determined that better math skills would lead towards the critical thinking and analytical skills that were also necessary for postsecondary success.

Those in attendance divided up into two groups: Life Sciences and Physical Sciences. Each group discussed what courses they would be covering and came up with plans for future work. The Life Sciences group will focus on entry-level biology. The Physical Sciences will focus on: earth science, chemistry, and physics.

The two groups were led by **Deborah Allen** and **Chris McGowan** respectively. These two will represent the science disciplines on the Curriculum Alignment Steering Committee.

Ms. Fuhrman explained that she was working to secure a course management system (Sharepoint) to facilitate discussion and document sharing. Ms. Fuhrman stated that she would send out an email with further information.

The next meeting is planned for September 28 from 11-3PM. The meeting will be held at the MDHE offices in Jefferson City.