Tuning American Higher Education:

The Process

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Tuning American Higher Education: **The Process** grows from the experience of The Institute for Evidence-Based Change (IEBC) in observing, facilitating, and debriefing groups who have engaged in Tuning initiatives. The presentation of Tuning's elements reflects the diverse experience of faculty in the different initiatives to date. As such, it describes the process while reflecting the variation of form that different Tuning initiatives can take.

Because of the potential for that variation, and because the process of Tuning must be responsive to particular contexts, disciplines, and faculty, Tuning American Higher Education: The Process should not be read as instructions or a mandate, but as a guide, one that will evolve as faculty in coming initiatives create new strategies for working through Tuning and share them with us.

Experienced members of the national Tuning community played an important role in informing and reviewing Tuning American Higher Education: The Process. We wish to thank all those who have participated in that review as well as all those who have contributed to the completion of this guide in other ways, especially the faculty who have shared their experience and ideas.

In particular, we are grateful to Teddi Safman, Bill Evenson, Norm Jones, Dan McInerney, and Janice Gygi in Utah, Leslie Mercer and Cheryl Maplethorpe in Minnesota, and Marianne Wokeck and Keith Anliker in Indiana, all participants in the pilot projects. From the subsequent initiatives, we are grateful to Mary Smith, Debbie Rodriguez, Kevin Lemoine, and Jim Nelson in Texas, Karen Carey in Kentucky, and with the Midwest Higher Education Compact, Ann Grindland, Chris Rasmussen, and Robert Stein. Special thanks are owed to Cliff Adelman and John Yopp, whose expertise on Tuning in both its national and international contexts proved invaluable.

Our thanks, finally, must also go to the William and Flora Hewlett Foundation and Lumina Foundation, for their ongoing support.

What is Tuning?

Tuning: a Global Phenomenon with National Variations

Put simply, Tuning is a faculty-driven process that makes what students know, understand, and are able to do at the completion of a degree in a given discipline or professional program explicit for students, faculty, family, employers and other stakeholders. Tuning started in Europe in 2000; the phenomenon spread to Latin America in 2005, to the United States in 2009, and is in process of planning and/or implementation in Russia, Australia, and Japan.

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Yet in every case, Tuning has been undertaken for different reasons and with variance in its core processes and coverage appropriate to different national higher education systems. Cross-national mobility was one of the principal drivers of European Tuning, along with linkages between institutions of higher education and professional and industry associations and learned societies. Specificity and clarity of learning outcomes and institutional improvement, more than mobility, drove the case in Latin America. Japanese planning sees Tuning discipline profiles and learning outcomes as a means of reshaping credits so that these proxies for student attainment could be accepted more easily by universities in other countries, particularly those that had engaged in Tuning. The U.S. is different, too. We'll learn how in a moment.

What Tuning Does and How: An Example

Tuning in a field provides a faculty-constructed profile that says to the world what a degree in X (bachelor's/master's) or preparation for a major in X (associate's) means. And it does so without compromising the distinctiveness and particular emphases of a given department's presentation of that major. The process requires collaboration among faculty from different institutions and institutional types across a state, professional organization/learned society, and/or region. It breaks down silos and brings faculty together to talk about their discipline across many lines. As noted by Minnesota's pilot project faculty report: "The Tuning process has brought to the surface our common ground."[1]

To grasp what Tuning does, let's take a case in point: Business. Initially, faculty from 15 institutions sat down and asked what core concepts governed their presentation of Business degrees at the bachelor's level. The consensus on those concepts constituted a reference template (see below) for the field.

That did not mean that the Business program at one institution would be a carbon copy of the Business program at another institution. It meant, rather, that no matter what emphases local faculty placed on those core concepts, and no matter what additional concepts local faculty would add, all those elements were covered in various ways. Consider, for example, the notion of a "firm." Everyone agreed that understanding the nature of firms lies in the core concepts for any Business program.

But what is a "firm"? This group agreed that a firm was a "value chain," with functions stretching from acquisition (of materials, technologies, communication systems, etc.) to customer service, and with all stops in between, e.g. marketing, accounting, alternative organizational structures, etc. The process of arriving at this definition involved consultation with both employers and recent graduates of business programs. The faculty group gleaned a great deal of input, but that hardly means that they would present the "value chain" to students the same way or with the same emphases.

Once the core concepts were established, the group turned to writing specific student learning outcomes under each of its components. Those outcomes allowed students' departments to write a supplementary statement to the bachelor's degree that said, "here is what this student attained in the matter of knowledge and skills in Business and its related fields" (for example, law and information technology); "this is what the graduate knows and can do." Again, this statement will be slightly different at different institutions, but it will have most of the same core concepts.

This example illustrates the core model of what Tuning does and how. We'll leave aside judgment of the success of learning outcome statements, depth of faculty involvement, and the measure of "critical mass" of faculty participation. We'll take up those topics in the context of Tuning USA.

[1]Minnesota pilot report pg. 21

Tuning USA's Differences & Benefits

There are obvious differences between the system of higher education in the United States and those of other countries in which Tuning has been undertaken. These differences have conditioned the unfolding and shape of our Tuning enterprise:

- Other systems start at the bachelor's level. Tuning USA also works at the associate's level. Our community college system—and the number of community college students transferring to four-year colleges—is large enough so that any account of progressive learning outcomes in a discipline that does not include both levels is incomplete.
- U.S. higher education is characterized by a broad liberal education, specialized learning with relevant societal applications, civic education for a democracy characterized by a pluralistic society, and instructional methodologies that are integrated, holistic, and inquiry-focused to student-centered learning. Tuning USA, in reference to Lumina's Degree Qualifications Profile (see below), keeps these characteristics in consideration.
- Because we have no federal education governance systems, as in Europe, state systems were the initial homes of Tuning USA pilot projects (Indiana, Minnesota, and Utah), with Texas and Kentucky joining subsequently. Regional and national-scale projects have since emerged, sponsored by compacts and academic associations.
- Tuning in other countries may have been proposed by faculty groups, but was funded by central government agencies or cross-national government agencies (most notably, by the European Commission). Tuning USA was a construct of the Lumina Foundation (based on research it had sponsored), and funded to date by both Lumina Foundation and the Hewlett Foundation. No government agency, federal or state, has been involved in funding.

Adapted to meet these distinctive aspects of the U.S. context, Tuning offers a means of strengthening American higher education. Generally speaking, Tuning enables faculty to better establish the quality and relevance of degrees in various academic disciplines and professional fields. More specifically, Tuning stands to produce the following six key benefits:

- Facilitating student success and retention, especially among students from underserved groups, by creating clear expectations for and pathways to degree completion;
- Simplifying the process for students transferring credits between institutions;
- Emphasizing lifelong learning and important but often undervalued transferable skills;
- Aligning the roles of higher education institutions;
- Increasing higher education's responsiveness to changes in knowledge and its application;
- Ensuring that the knowledge and applied skills associated with coursework align with civic, societal, and workforce needs.

In addition to these institutional benefits, Tuning can provide support to learners. In practical terms, the products of Tuning have the potential to improve student learning, to empower students to make informed decisions regarding their studies, and to enable students to understand the relevance of their academic training to professional, civic, and private endeavors.

Faculty who have participated in U.S. Tuning workgroups identify an additional outcome: pleasure, taken from discussing their discipline or professional field with others engaged in and passionate about it. In remarks to participants in a national-scale initiative, historian Patricia Limerick commented that the first edition of the Tuning guide lacked mention of "joy." She went on to describe the joy taken from collaborating with colleagues from a variety of institutions and institution-types. While different faculty and faculty workgroups will, obviously, have differing experiences of the work, pleasure taken in the collegiality remains a constant and is consistently highlighted by participants as a favorite part of the experience.

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Purposes of this Guide

This guide is intended not as a set of mandatory directives, but as a general architecture for Tuning within a U.S. context. Each faculty workgroup that engages in Tuning will do so in ways that suit group dynamics, disciplinary needs, or professional requirements. The processes upon which the work groups draw will, together, harmonize expectations for student learning. Those processes constitute the subject of this guide.

The core question is how these workgroups arrive at agreement on shared competencies and essential learning outcomes, not agreement on common curricula or presentation. Notice the key word, "essential." The Tuning process does not assume all competencies and learning outcomes in a field will be covered by its description of the discipline, rather it includes core competencies without which the student would be majoring in something else. A chemistry program group might rank laboratory risk assessment, error analysis, and identification of macro-molecules among its "essentials," and then again, might not include one of these. But without such core concepts, the student would not be majoring in chemistry, and the faculty would not be teaching chemistry.

Whether a department chooses to add spectroscopy or chromatography techniques to the mix of essentials is a local decision, and one often determined by faculty expertise. But these still reside within the bounds of chemistry, and not linguistics, for example.

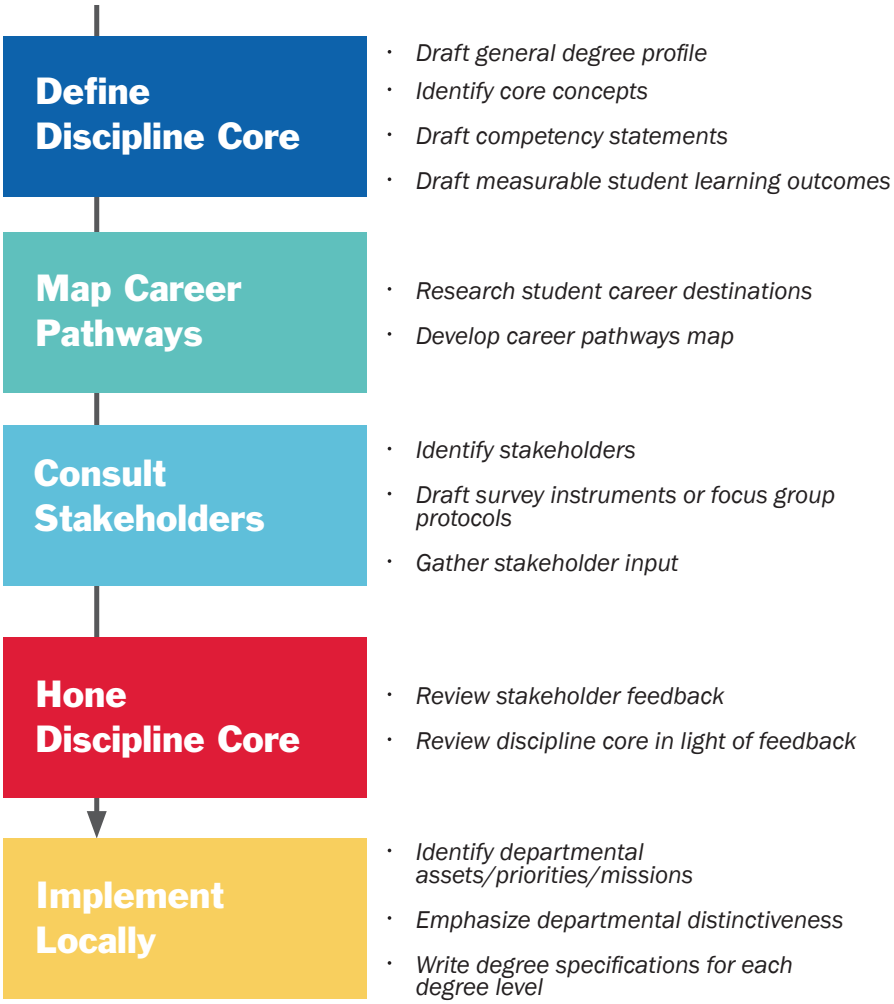
Core Processes of Tuning

Tuning's core consists of five discrete processes, each with its own constituent elements by which work groups identify what students earning a given degree in a given discipline know, understand, and can do. The sequence functions as a flexible methodology of recombinable, mutually reinforcing approaches to describing the learning graduates carry with them as they transition from one degree to another or from education to workforce. The five main processes are:

- *Defining the discipline core*
- *Mapping career pathways*
- *Consulting stakeholders*
- *Honing core competencies and learning outcomes*
- *Implementing results locally & writing degree specifications.*

Figure 1 represents a basic model for a typical Tuning initiative, but it does not demonstrate the way to proceed through Tuning. The base model initiates the work with the definition of the discipline core under the assumption that, when convening faculty experts, their common point of initial connection will be the fundamental learning that comprises the discipline. Defining the discipline core helps to stimulate ideas as the workgroup maps career pathways. To an even greater extent, within the base model, defining the core discipline informs the process of generating questions for other stakeholders that will, in turn, inform revisions. The revised discipline core, when completed, then becomes the basis for local efforts to internalize the document in ways unique to the particular circumstances and contexts of individual departments.

Figure 1: The base structure of a Tuning initiative



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Each of the five processes in the base model can be repeated in different ways to best suit the faculty's ends. Work groups might consider defining the core, mapping career pathways, or consulting stakeholders as possible starting points. The figures in the appendix describe variations on this base model. Moreover, work groups might also engage in more than one of the processes simultaneously. In fact, consulting stakeholders will ideally be an ongoing activity, with workgroup members maintaining an ongoing back and forth with colleagues in their home departments. (More will be said on this below.) Likewise, career pathway data can be gathered by individual workgroup members as workgroups collaborate to define the discipline core.

The exact configuration of these processes, however, depends on the given needs of the faculty engaged in Tuning. This base model (and any of the variations at the end of this guide) can serve as something like an interstate road map, but it is not the road. It is a highway with exits that faculty might take as they return to their campuses to try out ideas with colleagues or in classrooms to continually inform the work of the Tuning group. Faculty may find a variety of different strategies that enhance the process that may not be clearly identified as part of the five component processes above, but Tuning accommodates such explorations.

Tuning's Products

The core processes ideally result in three different types of documents that can be deployed in various contexts to clarify and explain the nature of a given discipline, the expectations for earning a degree, the career possibilities for degree holders, and the particular manifestation of the discipline within a specific program of study. The documents, which will be discussed more fully below, are:

- **Discipline core:** a description of the discipline's nature and core concepts, identification of the learning that comprises the discipline at the different degree levels, and statements of how students demonstrate their learning;
- **Career pathways map:** a document that describes the possible directions a program of study in the discipline can support and that can inform the process of consulting stakeholders;
- **Degree specification:** a description of the particular presentation of the discipline within a specific program of study.

These documents, in particular the discipline core and degree specification, are logically intertwined with another Lumina Foundation undertaking, called the Degree Qualifications Profile (DQP). The DQP is a generic set of related competencies at increasing levels of challenge from associate's to bachelor's to master's. Not only are these U.S. undertakings logically intertwined, but the Degree Qualifications Profile was a logical outgrowth of Tuning: the discipline-specific preceded the degree-specific, and the latter learned from the former.

The DQP offers a framework of five general areas of knowledge: Intellectual, Specialized, Broad/Integrative, Civic, and Applied. Tuning contributes to the framework of the DQP by defining in more detail the learning that constitutes Specialized Knowledge for a given discipline or field. The outcomes listed in the DQP's Specialized Knowledge area can assist Tuning workgroups in conceptualizing and describing the distinct levels indicated by different degrees.

Making Use of Resources

As the consultation of stakeholders suggests, Tuning's undergirding philosophy embraces the inclusion of outside inputs. Aside from the consultation workgroups engage in, reviewing existing documents can help to define the core discipline and map career pathways.

In Europe, as noted above, Tuning is more than a decade old and has yielded documents relating to over two dozen disciplines and professional fields. Many of those documents can be downloaded from the Tuning Europe website (http://www.unideusto.org/tuningeu/) and be utilized as inputs or inspiration for the definition of the discipline core. Additionally, more than a dozen disciplines and professional fields have been tuned in the various projects around the United States, and the resulting reports can be downloaded from Tuning USA's library of resources (www.tuningusa.org).

In Utah, for example, the history work group used statements drafted by U.K. historians and the American Historical Association (AHA) to structure initial conversations about the core competencies and outcomes. But these outside documents were not the sole directing factor, even though the Utah historians developed their own outcomes in relation to them. The key here is to strike a balance between the resources that professional associations can provide and the autonomy of the work group to consider those resources and add or subtract from them as members deem necessary.

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Disciplines and professional fields that are accredited will pose a different issue. Tuning these will be challenged by differentiating their professional standards/accreditation documents from the documents produced through the Tuning initiative. Dr. Bill Evenson of Utah's Physics Tuning group explains:

> While disciplinary accreditation standards differ appreciably from discipline to discipline, these expectations can be thought of as providing both the foundation and the motivation for Tuning. Tuning takes discipline faculty deeper and into more explicit outcomes expectations than do existing accreditation standards. Furthermore, Tuning reports can be organized and formatted so they are useful for accreditation. There need not be duplication of effort in this process.

He continues to note that:

> The Tuning process does not seek to supplant the criteria of discipline accreditation with different or expanded criteria. Rather, Tuning is complementary to discipline accreditation in that it seeks to define in specific and assessable terms the program objectives and learning outcomes, level by level.[2]

Implicit in Dr. Evenson's discussion is the distinction between the audiences of the two different sets of documents. Professional or accreditation standards documents are aimed at practicing professionals in a field, and as such, they define practices for those who already hold a degree. The products of Tuning, on the other hand, state in terms clear to all stakeholders (faculty, students, parents, potential employers) what students know, understand, and can do upon completion of a given degree.

Tuning workgroups who have attempted to work first from their professional standards documents have often struggled to move past those documents' representations of what comprises a discipline's or profession's core. As a result, some groups have elected to work from their own experience and 'consult' the professional standards documents afterwards. Other groups have elected to 'unpack' the standards documents and build core concepts and competencies out of them, from which they develop learning outcomes.

Workgroups in such disciplines or professional fields may want to keep in mind that standards documents do not always include some items of knowledge that are important. For example, a Tuning work group for elementary education determined that students should be able to explain the standards document itself, as well as the other structures that govern teachers. They considered drafting relevant learning outcomes under it. That sort of self-referential knowledge is rarely included in standards, but it is often essential for individuals working in a given field.

[2] "Relationship of Tuning and Disciplinary Accreditation," white paper available at www.tuningusa.org/library.

Defining the Discipline Core

Defining the core of a discipline is to articulate the body of knowledge and abilities that comprise the essential learning in the field at each degree level. This process involves four types of descriptors. The first two are a discipline profile and a template of core concepts addressed in the presentation of the discipline. The second two function together: a set of competency statements that defines competency at each degree level, and learning outcomes statements housed under the umbrella competencies. Both of these flow from the core concepts.

Discipline profile: a general description of the field, its areas of focus, and the range of approaches to those areas that are both legacy and emerging, i.e. traditional sub-fields (e.g. quantitative history, social psychology) and emerging sub-fields (e.g. parallel programming). It contextualizes the learning students do.

Core concepts template: a list generated by the faculty workgroup that identifies the essential learning targets (knowledge and skills) in the field, even though individual departments will place greater or lesser emphases on some of them. They follow the example of the "firm" in business programs as described above, or error analysis in chemistry, or morphological typology in linguistics. It defines the core discipline.

Competencies: categories of knowledge and learning within a discipline that are "ratcheted" up according to degree-level. They are drawn from the template of core concepts, with competency at each degree level described in a brief statement. They describe the levels of learning within the discipline.

Learning Outcomes: statements that describe the student response to learning. As part of the requirements of a degree program, they isolate assessable demonstrations of learning that indicate the proficiency with which students have mastered the sets of knowledge and processes that make up a given competency.

Defining the core of a discipline, therefore, is a process of

(1) *describing the nature of the discipline,*

(2) *identifying the bodies of knowledge and skill that comprise the core of the discipline and*

(3) *identifying what learning is expected at each degree level and the ways in which students can demonstrate their learning.*

Discipline Profile

Discussing the essence of the discipline or profession within Tuning work groups can ensure that a common understanding exists. Often, these discussions make ideas and ideals explicit that experts in the field maintain, but do not always find opportunity to express. Workgroup members often note that this sort of conversation brought rewards beyond those that accrue for students, that the self-reflection yielded a deeper appreciation for the field itself.

Work groups might consider the following sorts of questions:

Domain of the Discipline

- On what does the discipline focus?
- What issues does the discipline address?

Engaging in the Discipline

- What does 'doing' the discipline entail?
- What approaches does the discipline utilize?

Teaching the Discipline

- What parts of the discipline are established in early stages of education?
- What parts of the discipline are established in advanced stages of education?

Using Training in the Discipline

- How and in what contexts (professional, civic, private, etc.) is the discipline used?
- What does training in the discipline enable an individual to do?

The questions also encourage consideration of how a given discipline or professional field has changed in recent years as a result of developments internal to the discipline or field in response to larger forces, such as technology, politics, and economics.

Professionals in and practitioners of a discipline can take for granted the fundamental, organizing principles that define their own area of expertise. Students can benefit greatly from an explicit statement of the discipline's nature, because it can help them to comprehend the trajectory of their course of study, explain to employers the knowledge, skills, and ideas they bring to a career, and answer parents who ask "what can you do with that?"

To that end, the Discipline Profile is included in the Degree Specification (see pg. 25) as contextualizing information about the degree programs offered by a specific institution. Faculty can utilize the profile as a tool for advising students considering study in the field. As a resource for employers who hire outside of specific fields, a Discipline Profile can provide information about the applicability of the discipline to more general forms of professional activity.

Core Concepts Template

Unlike the general statements made in a discipline's profile (its purpose, structure, sub-fields, evolution, and applications), core concepts are specific essential knowledge and skills without which a field would be something other than its profile. These core concepts precede competencies and learning outcomes. They say, e.g.: "here is an area of inquiry without which the field is not the field in question," e.g. transport phenomena (for chemical engineering), irrigation design (for agriculture), or small ensemble performance (music).

The construction and consensus of the reference point template is the stage in the Tuning sequence at which faculty come to terms with the core of their field and its variations. It can begin as a moment of brainstorming a list that members of the workgroup then weigh and evaluate. It is also a point at which external consultation with colleagues, professional and learned societies, recent graduates, and employers in the field can prove helpful.

- What, specifically, and in the terms of the discipline, should graduates know, understand, and do? (colleagues/professional and learned societies)
- What, specifically, and in the terms of the discipline, did you find most important and useful in your jobs or academic life since you graduated? (recent students)
- What, specifically, and in the terms of the discipline, do you want graduates to know, to understand, and to do? (employers)

The input from different groups may clash. The Tuning workgroup responds by sorting, prioritizing, and producing not one, not two, but a whole template of such essential skills and knowledge.

Competencies and Learning Outcomes

Competencies are benchmarks of mastery (and mastery statements range from novice to expert); learning outcomes are discrete behaviors that, together, indicate that the benchmarks have been reached. Both can be discipline-specific or generic. Tuning starts with the discipline-specific.[3]

Again, let us illustrate, this time choosing music as the discipline. The competency categories—all flowing from the reference point template of the discipline—would include, e.g.

- Comprehensive musicianship analysis (application of knowledge of musical forms and structures)
- Fluency in historical and repertory literature
- Technically skilled performance
- Composition of original or derivative pieces
- Development and use of written and electronic scores

and, of course, others. These are the territories of learning outcomes. Underneath each one, the Tuning process ultimately describes one or more student behaviors that would demonstrate the competence. These descriptions are the learning outcomes.

So, for example, under "musicianship analysis" one might include a learning outcome of accurate aural to written dictation. Under historical and repertory literature, one might include a learning outcome concerning knowledge of music information sources and another on integrating cultural context in explaining differences in musical forms. One might see a learning outcome concerning whole tone compositions and another on improvisational forms. These are all as discipline specific as the competency territories themselves.

[3] "Relationship of Tuning and Disciplinary Accreditation," white paper available at www.tuningusa.org/library.

The sample competency statements in **figure 2**, below, are adapted from work by participants in the initial Tuning USA efforts. Each of these broad umbrella statements implies various smaller components. The competency from history, for example, includes knowing what is included in the historical record, understanding what causes it to be complex, and recognizing what sorts of problems arise and why. The statement also implies in its use of "emphasize" that students will apply this learning in service to particular uses. The same composite nature is also evident in the other example, too.

Notes

Figure 2: Sample Competency and Outcome Statements from Utah & Texas Initiatives*

Discipline	Competency Statement	Outcome Statements
History	• Students will analyze the complex contextual forces and problematic nature of the historical record.	• Recognize a range of viewpoints • Compare competing historical narratives • Debate/critique arguments of historical inevitability • Analyze cause-and-effect relationships and multiple causation
Civil Engineering	• Students recognize design as an iterative process that is often creative, and involves discovery and the acquisition of knowledge.	• The civil engineering graduate designs a system or process to meet desired needs within such realistic constraints as economic, environmental, social, political, ethical, health and safety, constructability, and sustainability.

*Adapted from reports available at www.TuningUSA.org/library

Learning Outcome Statements

If competencies are teacher-centered statements of the complex areas of knowledge that comprise a discipline or professional field, then learning outcomes are student centered statements that state explicitly and in assessable terms what a student should be capable of doing to demonstrate that he or she has attained the learning described in the competency statements.

Students and faculty benefit from outcomes that use active verbs and the level of specificity as featured in each of the examples shown—and in all good learning outcome statements. Such statements tell students what is expected and enable faculty to develop the most effective tools for assessing their success within distinctive curricula. Remember, however, that Tuning defines program-level outcomes, are more general than course-level outcomes.

A good learning outcome statement should be SMART[4]:

- **S**tudent-Centered: The statements should make clear to students what they will be expected to know or do to successfully complete the degree. While competency statements may seem to clearly state what we want students to learn, they often combine various elements of knowledge and skill, which necessitates their translation into more specific areas or items of knowledge.

- **M**easurable: The statements should facilitate clear means of assessment. If a learning outcome statement is well-written, then a means of assessment will be easily imaginable. Assessable, here, refers to the broad array of means, formative and summative, by which faculty gauge student learning, ranging from exams and papers at a formal level to more informal in-class activities.

- **A**ction-Oriented: The statements should utilize strong verbs. Strong verbs help students to understand what will be expected of them in their course of study, because they tell students what they should be able to do with the knowledge and skills that make up the core of the discipline. Bloom's Taxonomy (see the table on pg. 15) offers verbs that describe different degrees of engagement with subject matter. Note, however, that the increasing 'steps' in the taxonomy do not map to increasing degree levels. Students move through all levels of the taxonomy every year, often working with more complex materials as they develop from one degree level to the next.

- **R**esults-Driven: The statements should address the end-result of a student's learning process or the outcomes at the completion of a degree. Tuning endeavors to define for students what they should be able to do as a result of their learning, so the learning outcome statements should identify such gains.

- **T**ailored to Specific Degree Levels: The statem ents should be scaled according to whether the outcomes are appropriate to associate, bachelor's or master's degree work. What faculty expect of students at the end of two years is not as sophisticated as what is expected of graduates with bachelor's or master's degrees. Lumina Foundation's Degree Qualifications Profile offers a paradigm for scaling expectations to degree level and can serve as a useful resource.

In the above figure 2, each of the learning outcome statements offers a student's response to the learning experience—unlike the competency statements—in effect clearly laying out how the knowledge and skills identified in the competency statements show up in the course of their learning. Each of the samples identifies how students engage with those areas of knowledge and learning.

[4]The following was adapted from The University of Central Florida's Office of Experiential Learning webpage "Writing SMART Learning Outcomes." URL: http://explearning.ucf.edu/categories/For%20Students/Co-op_and_Internships/Registered _Students/Tips_for_Success/195_152.aspx. It originates in "Developing Effective Learning Objectives," by Kansas State University Career and Employment Services.

For example, in the history statements, the competency is broken down into four areas, each of which defines how a student "emphasizes the complex and problematic nature of the historical record." It is done by recognizing, comparing, challenging, and analyzing (i.e., the skills) a range of viewpoints, historical narratives, arguments, cause-and-effect relationships and multiple-causation (i.e., areas of knowledge). Notice, however, that the civil engineering example takes up a slightly different form: It explains in a single statement what students must do (complete a design—the skill) within the context of various constraints (areas of knowledge).

Notes

This issue will almost certainly arise: how far down should we dig in order to lay out the knowledge and skills expected of students? The key to resolving the issue is to remember that Tuning aims for measurable program-level outcomes, and so the nitty-gritty course-level outcomes need not become a focus. Course-level outcomes are the domain of individual departments.

A Note on Using Bloom

As shown in figure 3 (pg. 15), Bloom's Taxonomy describes a series of increasingly more complex learning activities, but it should not be taken as a map for how students demonstrate their learning at each degree level. Students at all levels, from kindergarteners through doctoral candidates, engage in each of the levels. Activities lower on Bloom's scale can be made more challenging by a complex object of focus (e.g., understanding String Theory), just as activities higher on Bloom's scale can be made less challenging by a simpler object of focus (e.g., creating a collage that conveys what it means to be a family). Writing effective outcomes, scaled to degree level, requires being cognizant of the complexity in both the activity and the object(s) of focus.

Figure 3: Action Verbs in Bloom's Taxonomy

Creating - The student creates a new product or point of view

Assemble, Compose, Construct, Create, Design, Develop, Formulate, Manage, Plan, Predict, Propose, Write

Evaluating - The student justifies a position

Appraise, Assess, Argue, Choose, Defend, Evaluate, Judge, Score, Select, Support, Rate, Value

Analyzing - The student distinguishes between different parts

Appraise, Categorize, Classify, Compare, Contrast, Criticize, Debate, Diagram, Differentiate, Discriminate, Distinguish, Examine, Experiment, Question, Solve, Test

Applying - The student can use information in a new way or context

Apply, Choose, Demonstrate, Dramatize, Employ, Illustrate, Interpret, Operate, Practice, Schedule, Show, Sketch, Solve, Use, Write

Understanding - The student can explain ideas or concepts

Classify, Describe, Discuss, Explain, Express, Identify, Locate, Recognize, Report, Review, Restate, Select, Tell, Translate, Paraphrase, Summarize

Remembering - The student can recall information

Define, Delineate, Duplicate, Label, List, Memorize, Name, Recall, Record, Relate, Repeat, Reproduce, Specify, State

From Discipline-Specific to Degree Generic

Notes

Tuning USA, unlike Tuning enterprises elsewhere, addresses the associate's, bachelor's, and Master's degrees. Following the principles of the Degree Qualifications Profile, any competency stated at the associate's level must be repeated at the bachelor's and master's, but at a higher degree of challenge. What do you want a nursing student at the associate's level to know about and do with the Physician's Desk Reference? What do you want a bachelor's degree recipient in nursing to know and do with the same information system?

The difference (and there naturally should be a difference) requires a "ratcheting up" of mastery and/or increased complexity in application (see the note on Bloom above). The Minnesota Tuning project chose Graphic Arts/Design as one of its disciplines, a field in which degrees are offered in the Minnesota system at the associate's, bachelor's, master's, and doctoral levels. Certainly, the competencies and learning outcomes were not identical across all those levels. What distinguished them were levels of problem challenge, software and equipment applications, the addition of time-based media, and topics concerning the business of graphics and environmental care and design. These are reflected in the "specialized knowledge" sector of the Degree Qualifications Profile.

From a different angle, the Indiana Tuning workgroup in chemistry identified 36 competencies, of which they determined 26 were common to both the associate's level preparation for a bachelor's major in chemistry and the bachelor's major itself. So, they asked, what distinguishes the two levels? The answer was obvious: the overlay of generic degree competencies such as those we see in the Degree Qualifications Profile: for example, at the associate's level chemistry is considered largely (though not exclusively) within itself, whereas the bachelor's level competencies lean heavily on integration of knowledge from both chemistry and at least one other field. The same kind of analysis was offered for analytic inquiry issues and the nature and degree of quantitative fluency, both of which are Degree Qualifications Profile categories with levels of challenge appropriate to degree level.

The Tuning process is thus inevitably linked to generic qualifications for degrees, no matter where one starts and at what point in the Tuning process the issue of distinguishing levels of challenge and competence arises.

Map Career Pathways

Mapping career pathways is a matter of determining the various careers open to graduates in the discipline or professional field being tuned. Mapping career pathways produces a clear picture of the employment landscape for graduates in a given discipline. Having that picture in place allows for more effective advising and career planning for students as they choose majors and complete their degrees. The resulting career maps help students identify options and build plans for their futures.

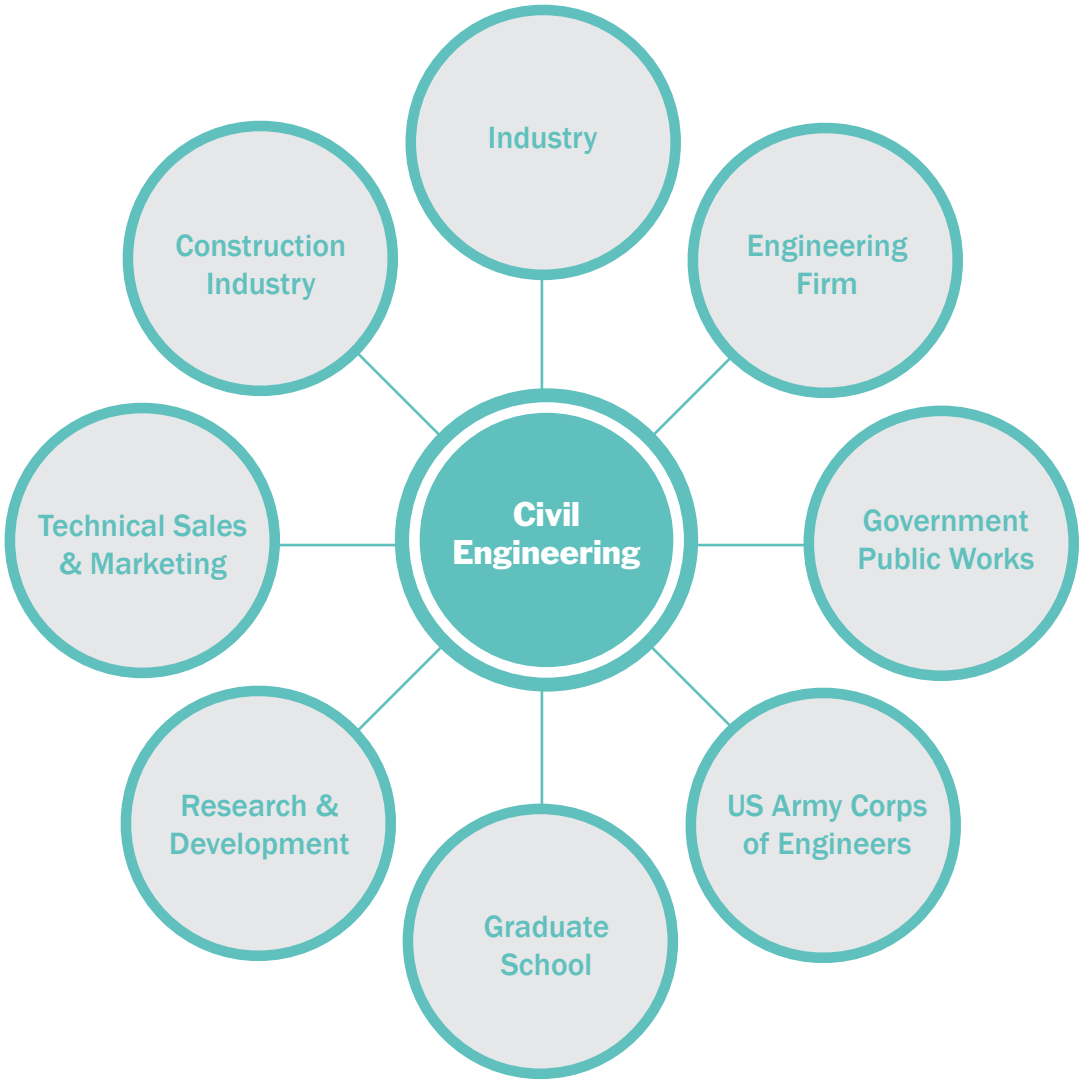
Figure 4 provides an example of a career pathways map that was produced by one of the engineering groups in the Texas Tuning initiative. It provides students with a simple diagram that displays the various career paths opened to them by pursuit of the degree. Discipline groups need not necessarily produce a graphic presentation like this, but such a diagram can be helpful to students as they consider their futures.

Consultation with advisory boards, career centers, alumni associations, professional associations and state education-to-workforce data systems can provide valuable insight into career pathways. It is also important to include graduate programs in consideration of employability. While graduate programs are not technically employers, they do function as a frequent "next step" in student career pathways.[5]

As a part of the Tuning process, mapping career pathways might best be considered a parallel process, important in its own right, but not part of defining the learning content of the discipline core. That being said, Tuning workgroups often find such work helpful when developing lists of stakeholders to consult. The career pathways information provides sometimes unexpected places from which to seek input. Richer feedback can be the result.

[5]Graduate programs not specific to the discipline should be included. For example, work groups in history will want to include graduate programs in the discipline, but may also want to include programs in law and public management; similarly, work groups in subjects such as biology may want to include programs in medicine and other related fields.

Figure 4: Employability Map from Texas' Civil Engineering Tuning Group



Consult Stakeholders

Ideally, consultation will will be relegated to a 'step' in the initiative, but be an ongoing, back-and-forth activity. Consultation of other stakeholders may be the most important process of Tuning, since it enlarges the dialogue that shapes the results of the work. One group, for example, surveyed stakeholders to receive input towards defining the core discipline and then vetted their results in a second round of surveying.

Consultation, moreover, need not always be a large, formal engagement with stakeholders. Simple updates to colleagues, department chairs, deans, provosts and/or state-level offices go far in maintaining an environment supportive of the Tuning initiative. Faculty participants in the Tuning workgroup can also 'consult' colleagues in chats in the hallway or with updates at department meetings. They can 'consult' students by asking questions before or after classes. In fact, the frequency of this sort of informal consultation, especially with colleagues in home departments, is a predictor of the effectiveness of Tuning in individual institutions.

That being said, not all stakeholders can be engaged in such regular consultation. Alumni and potential employers require a more systematic effort by workgroups. The rationale for consulting these groups as stakeholders recognizes that higher education serves multiple purposes. In addition to the production and preservation of knowledge that many faculty value, higher education produces contributing members of our society. Higher education, in other words, considers the civic mission of higher education and employment futures important to students and their families.

How does one consult? In the past, both mailed and electronically-delivered surveys have been used, but Tuning USA participants have found focus groups a more promising approach, as they yield greater depth, substantive feedback, and opportunities for expanded responses. Whatever the method and timing of consultation, Tuning workgroups should design consistent protocols.

What information would be helpful for the workgroup as it considers the discipline or professional field being tuned? The openness of that question points to the tremendous range of possibilities consultation offers. Each stakeholder group can provide unique insights into the discipline, its application post-graduation, its perception by different constituencies, and the competencies necessary for future success.

Colleagues

Colleagues in home departments, as well as those in departments at institutions not represented on a Tuning workgroup, can help to identify competencies essential to the discipline or professional field, as well as for the degree levels at which specific outcomes should be attained. Additionally, colleagues can be consulted in efforts to vet the core discipline once it has been drafted. They are key to attaining a critical mass of instructional staff who endorse and adopt the conclusions and recommendations of the core Tuning workgroup.

Students and Alumni

Students can provide valuable insights into how the discipline is perceived, what motivates the decision to major in a given discipline or professional field, expected careers, and disciplines associated with the major through minors and certificate programs. Alumni, having made the transition from education to workforce—or not—can provide insights that both reflect on their educational experiences and consider their experience with the degree post-graduation.

Student Support Personnel

Every campus has academic advisors, career counselors, and graduate directors dedicated to advising students as they make their way through their educations and on to next steps, whether those steps are further education or employment. Often, those members of the campus staff develop acute awareness of hiring trends, expectations for graduates entering the workforce, requirements for admission to graduate programs, and other such factors that can impact the further success of students.

Potential Employers

Employers refers to those corporate, government, and organization personnel who interact regularly with institutions of higher education, and whose interaction has a particular disciplinary focus. For the most part, we are not talking about human resource development personnel when the term “employers” is used. A music administrator of a symphony orchestra who attends college concerts and faculty seminars and participates in panel discussions of the state of the industry would be a good example of an individual who might be consulted. A vice president for research at a materials engineering lab who provides equipment to the institution and talks with students about their creations in response to client needs would be another.

Hone Discipline Core

The fundamental result of a Tuning process is a consensus statement of (a) a field's profile, (b) the most important concepts and skills by which its faculty and students navigate its presentation, and (c) a list of primary competencies and learning outcomes that flow from the territories of navigation.

Arriving at such a consensus statement involves research, gleaning, convergence, and drafting, followed by placing a Beta version of the full statement on the tables of the consultation groups listed above, along with specialized accreditation bodies (where applicable), learned societies, industry associations, and faculty in related disciplines. The experience of the European "thematic network" in chemistry, which, after 9 years of Tuning work has now been joined by the chemical engineers and chemical technologists, bolstered by industry associations, is a particularly worthy example. What started as a Beta Tuning statement became cross-national degree specifications.

Outside resources also prompt reconsideration of the discipline core. In some instances, workgroups have delayed use of professional standards documents or accreditation standards until they have captured their own notions of the discipline core. With a draft in hand, those groups have compared, contrasted, and ultimately synthesized their general discipline profile, core concepts, and competencies & learning outcomes with the professional or accreditation standards.

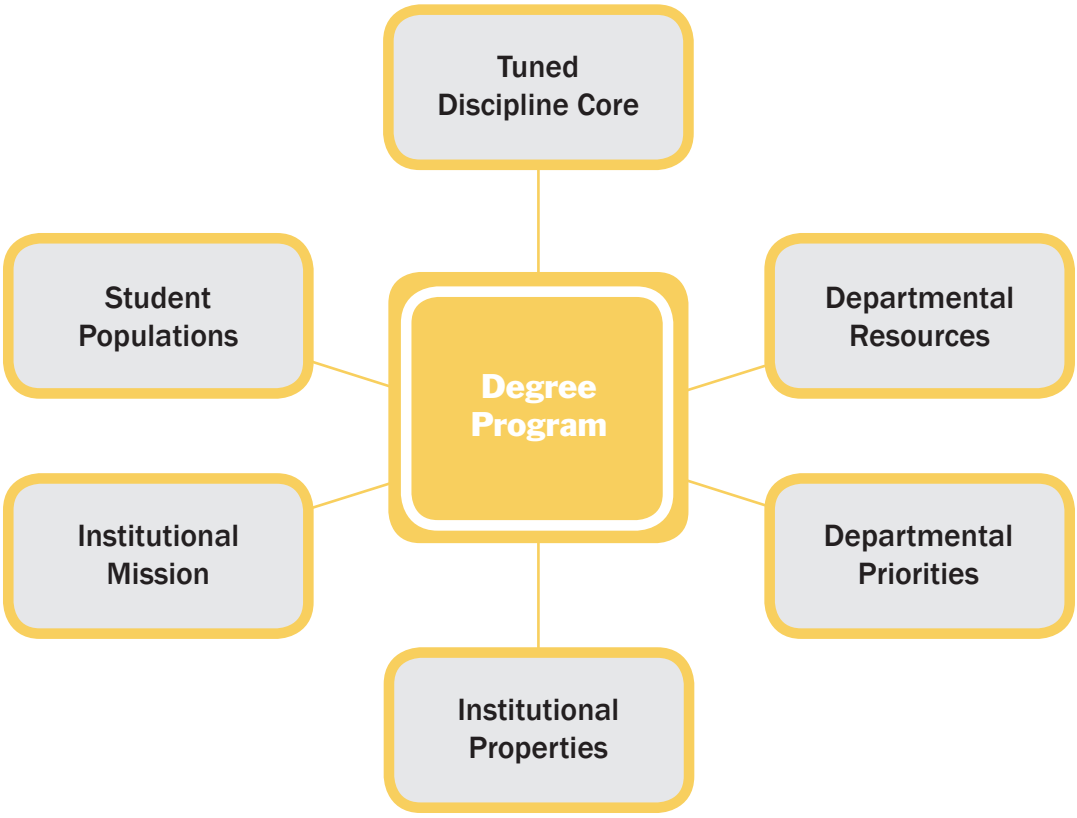
Vetting of the consensus statement and its accompanying documents, particularly with faculty at institutions that did not participate in the discipline's Tuning workgroup, can also generate valuable input by which to revise all the components—profile, reference point template, and competency and learning outcome statements. Seeking and responding to such input also signals to colleagues that the process has been open and inclusive.

Implement Results Locally

After faculty work groups complete their work on the discipline core, Tuning continues with department faculty following a similar approach to make their particular expression of that core intentional within their own distinctive curricula. The basic idea behind both the Tuning group and departmental implementation work is that the faculty endeavors through conversation or exploration to make explicit what it collectively believes to be essential to student learning for each degree level within the discipline or professional field at that particular institution. That description is communicated in **Degree Specifications**, described below.

The fundamental aspect of Tuning that needs to be kept in mind throughout this process is that every department has its own unique circumstances that will shape the process and its results, as represented in the figure below. That distinctiveness needs to be acknowledged. The motto developed by our European counterparts has been, "Tuning of educational structures and programmes on the basis of diversity and autonomy." The application of Tuning's results at the local level is where that respect for "diversity and autonomy" finds its fullest expression.

Figure 5: Factors affecting local implementation of Tuning



The one caveat is this: Because the work of Tuning has been to ensure that any student completing a given degree does so with the same core learning, it is important to include the competencies and learning outcomes developed by the Tuning work group in local efforts. Tuning also strives for institutional distinctiveness and autonomy. If a department believes that there are additional important competencies or outcomes beyond the core, those should be included, too.

Each institution has its own unique set of factors that shape the particular programs of study it offers. As figure 5 suggests, the tuned core discipline is just one of those factors. Departmental resources, such as collective areas of faculty strength, lab space, technology, and even library holdings should shape the tuned core at an institution. Likewise, priorities set by the department or larger institution, such as civic engagement or service learning, collaborative learning experiences, or interdisciplinary approaches should necessarily contribute to the specific expression of the tuned core. Institutional mission and student populations play a role, too.

Initiating Departmental Conversations

In the local implementation of Tuning, a department's faculty will take the end goal (the tuned discipline core) and clarify or build the structure necessary to bring students to the outcomes it represents, a structure influenced by the various distinctive features noted above. The history department at Utah State University, for example, started their conversations around their senior capstone course, working to identify appropriate outcomes for the class and, based on those, then determined how the curriculum needed to be revised to prepare students to meet them.

The shape of any department's particular discussions might start in a similar place, but not necessarily. Again, the specific circumstances of a department will determine the exact nature of their conversations. If a department is unclear as to where to begin, here are some starting points to consider:

Familiarity with the Purpose of Tuning

The department may need to become familiar with the tuned discipline core. That foundation equips the department to work collectively from a shared understanding. How you generate that familiarity might range from simple e-mail correspondence to a report at a department meeting to a discussion of the document in a faculty forum.

Identifying Competencies and Outcomes in the Curriculum

Since the tuned core states what is believed to be a shared definition of the discipline or professional field, it stands to reason that most, if not all, of the competencies and/or outcomes will be present in some form in the existing curriculum. The department may find it useful to examine its course offerings to determine precisely how they address the core competencies and outcomes. Where, for example, does each competency get addressed and each outcome assessed? The department's faculty can also identify further competencies and/or outcomes that it believes to be important; doing so contributes to the distinctive character of that program.

Establishing Outcomes/Competency Levels

Tuning groups assign different levels to the outcomes within the various competencies, because what a student knows and can do at the end of two years is different from what a student knows and can do after four years. Thus, departments may want to consider how the existing curriculum addresses those different levels by mapping competencies and outcomes to courses within the curriculum. In effect, this conversation might examine what second-year coursework expectations are versus third- or fourth-year coursework expectations within the curriculum.

Curricular Innovations

Notes

The department's faculty may wish to explore new ways of incorporating competencies and/or outcomes. Changes might be made to course sequences, course requirements, or assignment types. Additionally, some consideration might be given to how major and general education programs can be made to work together more productively. Lumina Foundation's Degree Qualifications Profile can be a valuable resource in making those connections.

Improving Communication with Students

If one of Tuning's benefits is the way it clarifies for students what they are learning, then the department may wish to discuss ways to help students access that information and articulate what they know. The department faculty can devise strategies for familiarizing students with the tuned core discipline and learning pathways within the curriculum, whether through curricular modification or changes in existing department-student communication structures.

The Degree Specification

The degree specification identifies how the tuned core discipline manifests uniquely in each institution. But, as Tuning aims at defining core concepts and not at standardizing education, then the degree specifications are where that individuality is made explicit. The format of the Degree Specification is somewhat standardized, but the content within should be distinctive. If ten different baccalaureate institutions participate in a Tuning work group, then ten distinct baccalaureate-level degree specifications should result.

The degree specification features five elements of a degree program:

- **Purpose:** a general statement on the degree track's overall purpose;
- **Characteristics:** description of the degree program as it is uniquely expressed in the specific institution;
- **Resulting employability:** summary of the discipline's career pathways;
- **Education style:** program-specific description of how curriculum is delivered;
- **Program competencies and outcomes:** list of competencies and outcomes expected in the program.

The primary audience for the degree specification is students, so it should be aimed at providing them with the information they need to understand the degree in general, the department's specific approach to the degree, and the expectations for those undertaking the degree. Equipped with the degree specification, graduating students are also able to articulate what they know, understand, and can do. That makes potential employers a secondary audience. They may benefit from having a clear understanding of what knowledge and skills students bring to them as potential employees.

A well-written degree specification can enable students to make informed choices about majors, understand degree requirements, appreciate how their education prepares them for civic life, and communicate to potential employers what they know, understand and can do. A well-written degree specification should:

- Be readable in just a few minutes;
- Provide a clear impression of the specific degree; and
- Give some detailed information where necessary.

Figure 6: Degree Specification Template

Institution Name & Department Degree Name

Purpose	This field can be used to provide a succinct statement of a department's philosophy as it relates to the specific degree level. The field might begin with a more general statement about the nature and purpose of the degree.
Characteristics	This field can highlight the distinctive features of the degree track, including disciplines and featured subject areas, general and specific focuses, etc.
Career Pathways	This field identifies possible destinations of the degree program's graduates.
Education Style	This field identifies the department's particular learning/teaching approaches, such as lectures, small seminars, and labs, and describe the assessment methods used by the department, such as discursive tests, analytical papers, culminating research projects, and comprehensive exams.
Program Competencies & Outcomes	This field lists the program-level learning outcomes, organized by competency area, that were developed by the Tuning work group. It should also include additional competencies and their relevant learning outcomes in addition to those developed by the Tuning work group.

Possible Concerns

Notes

Despite Tuning's potential for supporting student learning and success, initial reactions to the process can be laced with suspicion and concern. Some concerns are inevitable, but concerns can form the foundation for stronger collaboration if they are discussed explicitly. Not all faculty will be equally open to the goals of Tuning, for whatever reasons—and some of them may be good. Open conversation, making assumptions explicit, and striving for clarity, however, may enable colleagues to find the common ground that Tuning seeks from the beginning. What follows are some of the common concerns.

Tuning is just another assessment initiative.

Assessment is indeed part of Tuning, but Tuning aims for more. Tuning aims at increasing student learning and success, at raising the quality of the education students are given. Those efforts derive from faculty's role in defining the standards and, in the process, potentially increasing the standards to be met by students. Without some form of assessment, there would be no way of identifying the degree to which students are meeting those standards.

In addition, assessment is a standard practice in every faculty member's classroom, whether the form of assessment is essays, quizzes, multiple choice tests, written exams, presentations, or some other means. Tuning does not attempt to stipulate some universal form of assessment. Neither does it seek some reductive numeric assessment system. Tuning simply asks faculty to be as explicit as possible with students regarding what is expected of them, that clear criteria for evaluation be communicated to them, and that the means of assessment be appropriate to what they have been asked to do. (You would not, for example, want to give students a multiple choice exam for a capstone initiative if your aim is to assess the ability to research and compose an analytical argument.) Most faculty are already doing this, but Tuning asks for a reflective pause to consider the degree to which the assessment tools being used are clear and appropriate.

Tuning's implicit approach to assessment is that it comes from a bottom-up effort in which faculty set the terms rather than administration or accrediting agencies. Assessment is often perceived as a top-down initiative, but Tuning inverts that perception so that faculty defines the basis on which students will be assessed based on the particular demands of the given discipline.

This initiative intrudes on academic freedom.

This objection is an important one, since part of what defines higher education is the freedom of faculty to pursue research where the evidence leads and to instruct students as their expertise deems best. Tuning recognizes the stunning diversity of interests and approaches that comprises a field of study. As has been mentioned throughout this guide, Tuning encourages that diversity by asking faculty to identify what they believe to be the *core* of a discipline, leaving all that surrounds that core to be determined by individual departments and faculty members.

Implementation of Tuning does not seek to flatten individual departments' distinctive identities or faculty members' particular styles. Rather, implementation of Tuning asks the members of the faculty to investigate what they hold in common with the other members of a discipline or practitioners in a field. Tuning encourages members of a department's faculty to find out what they share, despite the plurality of interests and approaches. Tuning identifies a framework of expectations that accommodates those individual and distinctive enterprises and interests.

This sounds like curriculum review and revision.

Implementation of the tuned core discipline does, in fact, point to a potential revision of the curriculum. Once Tuning identifies a discipline's core competencies and resulting learning outcomes, then consideration of the degree to which a curriculum facilitates that learning may necessitate revision to align the curriculum with *what the faculty have agreed* are the essential competencies and outcomes. The degree to which any given department revises its curriculum, however, is up to its faculty and can range between two poles:

1. Curricular articulation: the department identifies how the existing curriculum facilitates the learning identified in the tuned core discipline (not to mention any additional competencies/outcomes the department may deem important). The result may be a reframing of how the existing curriculum is presented to students.

2. Curricular revision: the department identifies the extent to which the curriculum may be misaligned with the list of competencies/outcomes and reorients the curriculum to meet both the needs identified by Tuning and additional needs faculty believe to be important.

Tuning does *not* demand a complete rebuilding of existing curricula. Tuning does offer an opportunity to become more intentional about curriculum. Tuning, to that end, is an invitation to pause and, with colleagues, make explicit the curricular assumptions that undergird how department faculty instruct their students.

Tuning reduces the work of research and scholarship to employment skills.

This objection signals the commitment to preserving the life of the mind and not conceding to the demands of the marketplace. Asking for the opinions of potential employers can seem to be making such a concession, but that is not what Tuning seeks. It is not an either-or situation.

It is true that Tuning invites input from potential employers, but Tuning does not give that body of stakeholders either an authorizing role or veto power. They are simply consulted as significant figures in students' futures. As such, it is important that faculty understand what employers want students to know, understand, and be able to do.

Tuning assumes that the cultivation of intellect develops applicable knowledge and skills. If asked, most faculty can make a strong case for how a discipline prepares students for life out in "the real world," for how it equips them with knowledge and abilities that will help them in their personal, civic, and professional lives. Tuning asks that faculty consider this in order that students can better understand what the applicable skills and areas of knowledge are.

Glossary

Career Pathways Map: a document that describes the possible directions opened to an individual by study in a given discipline, including not just careers but further education. The process of developing such a map can inform the process of consulting stakeholders.

Competencies: benchmarks of mastery for categories of knowledge and learning within a discipline that are "ratcheted" up according to degree-level. They are drawn from the template of core concepts, with competency at each degree level described in a brief statement. They describe the levels of learning within the discipline.

Core Concepts Template: a list generated by the faculty workgroup that identifies the essential learning targets (knowledge and skills) in the field, even though individual departments will place greater or lesser emphases on some of them. They follow the example of the "firm" in business programs as described on pg. 11, or error analysis in chemistry, or morphological typology in linguistics. It defines the core discipline.

Degree Qualifications Profile: a generic set of related competencies at increasing levels of challenge from associate's to bachelor's to master's. Produced by Lumina Foundation, it provides a paradigm for scaling expectations to degree level.

Degree Specification: a description of the particular presentation of the discipline within a specific program of study.

Discipline Core: a description of the discipline's nature and core concepts, identification of the learning that comprises the discipline at the different degree levels, and statements of how students demonstrate their learning.

Discipline Profile: a general description of the field, its areas of focus, and the range of approaches to those areas that are both legacy and emerging, i.e. traditional sub-fields (e.g. quantitative history, social psychology) and emerging sub-fields (e.g. parallel programming). It contextualizes the learning students do.

Learning Outcomes: statements that describe the student response to learning. As part of the requirements of a degree program, they isolate assessable demonstrations of learning that indicate the proficiency with which students have mastered the sets of knowledge and processes that make up a given competency.

Tuning Workgroup: a group of faculty from various institutions within a discipline and within a state, region, or learned or professional society that collaborates on defining their discipline's core learning.

Tuning: a faculty-driven process that makes what students know, understand, and are able to do at the completion of a degree in a given discipline or professional program explicit for students, faculty, family, employers, and other stakeholders.

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