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The Language of Learning Outcomes: Definitions and Assessments

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Executive Summary

Postsecondary education has reached a critical impasse. Structurally speaking, the Canadian system does not look much different than it did 50 years ago. But the system's dynamics have changed considerably: reduced government funding and the tough economic climate make efficient financial models a necessity for healthy institutions; student debt loads are increasing; underemployment is a reality for many undergraduate degree-holders; and the student body is increasingly diverse, with growing numbers of international students, students from historically underrepresented groups, mature students returning to PSE to improve career prospects, and students having to work at least part-time to manage the cost of education. To ensure that our system is accountable, accessible and of the highest quality, we need to define and assess educational outcomes at both the institutional and student levels.

Against this backdrop, postsecondary learning outcomes are rapidly replacing credit hours as the preferred unit of measurement for learning. Not only do learning outcomes lend themselves to a common language of skill development, but they are also multipurpose: in Ontario alone they have been used, to varying degrees, in quality assurance, professional accreditation, program standards, qualifications frameworks, curriculum design, skills assessments and credit transfer agreements. However, the expanded presence of learning outcomes at the postsecondary level has outstripped our abilities to validate those outcomes through assessment, both in terms of the quantity and diversity of outcomes and the comparability of the language used.

Indeed, the boom in postsecondary learning outcomes can be difficult to navigate. Not all institutions use the same terminology to articulate skills and competencies, which affects the extent to which outcomes can be assessed and interpreted reliably. HEQCO's response to these circumstances has been structured around a typology including four different classes of postsecondary learning outcome appropriate to the Ontario context: basic cognitive skills, discipline-specific skills, higher-order cognitive skills and transferrable skills. Together, these categories can be used to guide postsecondary outcomes assessment and, in doing so, create a shared foundation for postsecondary learning quality. Moreover, the four categories provide a set of interpretive lenses that can bring into greater focus the different assessment and policy considerations for each domain.

This report applies the four categories to the current state of learning outcomes assessment in postsecondary education, examining the different dynamics of each in detail, as well as areas of overlap between them. We then identify the unique challenges and opportunities presented by the four different strands of learning outcomes, with the goal of clarifying existing outcomes frameworks and identifying areas for further development and assessment.

If implemented properly, the learning outcomes approach can serve the purposes of accountability and quality measurement. However, it is not enough to revise policy infrastructure and map outcomes across credentials. In order for a system to be truly outcomes-based, we need to prove that students are graduating with the skills they need to succeed. Assessment remains the keystone of the learning outcomes approach at the postsecondary level, though it is not always taken seriously. If given proper consideration, learning outcomes assessment could be an invaluable source of strength and flexibility for a system in transition.

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Introduction

Canada is an international leader in postsecondary education (PSE) attainment, ranking third among OECD countries with a rate of 53% for the population aged 25 to 64 (Canadian Education Statistics Council, 2014; OECD, 2014a). While this statistic is often lauded, its meaning and significance is evolving. As the cost of getting a postsecondary education rises and as more and more individuals come to possess a postsecondary credential, students, stakeholders and employers are increasingly looking beyond attainment rates to consider institutional accountability, learning quality and labour market alignment as ways of measuring the effectiveness of the postsecondary system. Are students learning the skills and knowledge they need to be successful in work and life? The answer to this question requires a change in focus to the definition and assessment of student learning outcomes.

Generally speaking, learning outcomes are “broad, yet direct statements that describe the competences that students should possess (i.e., what students should know and be able to demonstrate) upon completion of a course or program” (Kenny, 2011). By defining clear objectives for student learning that are aligned with assessment and credential frameworks, and by linking skills to demonstrable student behaviours that can in turn be assessed, the learning outcomes approach can:

- allow educators, administrators and policymakers to assess whether or not students are actually learning the skills that institutions claim to be teaching;
- allow institutions to identify and implement teaching practices that effectively develop student skills, rather than focusing simply on the delivery and acquisition of disciplinary content; and
- create a common language so that members of the PSE sector, the labour market and the public can discuss what is expected of postsecondary graduates.

This last point can be particularly important for students. If they can clearly articulate the life skills and competencies they have acquired, they may be better equipped to understand the value of their education and to market their skills more effectively to employers or graduate programs.

Although the learning outcomes approach is rooted in American psychology, it gained particular momentum in Europe with the launch of the Bologna Process in 1999, which sought to align PSE outcomes and credentials across EU countries (Krathwohl, 2002; Kennedy et al., 2006). Learning outcomes have since become the subject of experimentation and research at educational institutions around the world (Lennon et al., 2014). While this work has generated a considerable body of literature on the topic, it has also given rise to a myriad of ways of interpreting and realizing the objectives of learning outcomes, many of which are particular to specific institutions or disciplines. At the same time, the development of learning outcomes at the institution level has compromised one of the ultimate goals of the learning outcomes approach – the development of a common language for student learning that might be applied across sectors or institutions (Blaich & Wise, 2011).

Ontario already uses the language of learning outcomes. The Ontario Qualifications Framework (OQF), for example, identifies specific graduate competencies for a full range of credentials offered at the province’s postsecondary institutions (Ontario MTCU, 2009b). Ontario’s commitment to learning outcomes is also demonstrated in the universities’ Degree-Level Expectations (DLEs) and the colleges’ Essential Employability Skills (EESs) profile, both of which outline the skills a student is expected to possess by the end of their

course of study (Ontario MTCU, 2009a; COU, 2011). The way in which this language has been interpreted and applied at the institutional level, however, has often varied.

HEQCO's own work on the topic of learning outcomes has sought to bridge this gap by developing a language to describe the skills expected of postsecondary students that could be applied across the Ontario context. This typology of learning outcomes was first proposed by Weingarten (2014, Feb. 13) and outlines four classes of learning outcomes:

- 1) Basic cognitive skills, such as literacy and numeracy;
- 2) Disciplinary content, referring to the knowledge and content students are expected to have acquired in their field of study;
- 3) Higher-order cognitive skills, such as problem solving and critical thinking; and
- 4) Transferable life skills, sometimes called 'soft skills' or 'essential skills' and including behavioural and personality attributes such as initiative, resilience and time management.

The purpose of this report is to further develop HEQCO's approach to learning outcomes by discussing and describing each of these categories in greater detail, while acknowledging the overlap and the gray areas between them. The report draws heavily on the literature to move this typology from one that was presented in a preliminary fashion in Weingarten (2014, Feb. 13) to one whose form and content is made clear by grounding it in relevant research. To achieve this end, the report moves through each of the learning outcomes categories mentioned above in turn to discuss how each group of outcomes is conceptualized and what specific skills or knowledge it contains. The report also outlines the various methods and tools that exist to assess each of the categories of learning outcomes.

1. Basic Cognitive Learning Outcomes

Basic cognitive skills include literacy and numeracy (Weingarten, 2014, Feb. 13). These skills make up the foundation of every level of education and in recent years have been restructured around learning outcomes in many countries. On the one hand, the Organisation for Economic Co-operation and Development (OECD) has correlated literacy and numeracy proficiency with increased labour market participation and higher wages, highlighting the clear benefits of well-developed basic cognitive skills (OECD, 2013). On the other hand, however, literacy and numeracy skills are a point of perennial concern in Canada, as OECD assessments of Canadians' skill levels show no real improvement over the last 20 years (Dion & Maldonado, 2013).

Though literacy and numeracy make up a significant part of the K-12 curriculum, basic cognitive outcomes are also important in PSE, as these skills are foundational to more complex study as well as to employability. At the elementary and secondary levels, literacy and numeracy are measured against provincial curriculum standards for each grade. There are no comparable standards in PSE, and the definitions and assessments used by individual institutions vary considerably. While Ontario's colleges and universities are committed to producing literate and numerate graduates, the current approach to teaching and assessing basic cognitive outcomes is unsystematic.

The identification of basic cognitive skills requires that we distinguish these foundational skills from associated, though more abstract, higher-order cognitive outcomes. In other words, it is not always easy to

determine where literacy and numeracy end and more specialized communication and mathematical skills begin. Despite the difficulties it presents, this distinction is essential to designing meaningful, appropriate outcomes assessments at the postsecondary level. As students enter PSE with a broad range of skill sets and abilities, it is increasingly clear that postsecondary institutions need to establish a baseline level of competency for basic cognitive outcomes and assess these skills upon admission to ensure that students possess a strong base of literacy and numeracy skills upon which more complex skills can be built (Dion & Maldonado, 2013).

The conceptualization of basic cognitive learning outcomes presents a number of other challenges. One concerns the lack of conceptual clarity around literacy and numeracy, which affects the extent to which we can measure these skills effectively. Another concerns the lack of clarity in postsecondary policy around the foundational importance of basic cognitive outcomes for higher learning. While individual postsecondary institutions use a variety of definitions and assessment tools to measure literacy and numeracy skills, there is still confusion about the importance and value of basic cognitive outcomes for all students in all disciplines in any course of postsecondary study.

The discussion below touches on both of these points, outlining the ambiguous value afforded to basic cognitive outcomes in PSE and the general lack of distinction between basic cognitive skills and higher-order skills. This ambiguity makes it easy to neglect basic cognitive skills at the postsecondary level, relegating them instead to the K-12 sector and focusing only on higher-order skills. We close the section by discussing the various methods available to assess the development of basic cognitive skills.

1.1 Basic Cognitive Outcomes and Postsecondary Policy

The importance of basic cognitive outcomes in PSE is not always articulated clearly in qualifications and credentials frameworks. This occurs in part because postsecondary education in a given province or territory is supported by several layers of policy guidelines, each originating from a different source. Though the Council of Ministers of Education's *Ministerial Statement on the Quality Assurance of Degree Education in Canada* (2007), a shared point of reference for all provinces and territories, makes clear the importance of basic cognitive outcomes in a postsecondary context, it is perhaps not surprising that some of that clarity is lost in translation by the time it trickles down to the institutional level.

We can observe this ambiguous emphasis on basic cognitive outcomes in Ontario, where the lack of clarity around basic cognitive outcomes results in part from their situation in the various provincial frameworks. The emphasis on literacy would seem to be relatively clear, with the OQF identifying literacy as one of a set of communication skills expected of graduates (Ontario MTCU, 2009b). Numeracy, however, is never mentioned explicitly and is not housed in its own category. While the OQF does make reference to data analysis skills, some of which might be assumed to be quantitative, these skills are presented in discipline-specific contexts, making it more difficult to argue that numeracy is a desirable skill for all graduates, including those studying in non-quantitative fields (Ontario MTCU, 2009b; Dion, 2014). Since the OQF informs the DLEs and EESs, this ambiguity is passed down the line.

The DLEs draw no clear distinction between basic cognitive and higher-order skills. It is also lacking from the Essential Employability Skills profile, which discusses skills that could reasonably be seen to fit either category, such as the ability to “communicate clearly, concisely and correctly in the written, spoken, and

visual form that fulfills the purpose and meets the needs of the audience; respond to written, spoken, or visual messages in a manner that ensures effective communication; and execute mathematical operations accurately” (Ontario MTCU, 2009a).

The OQF, DLEs and EESs set the tone for the postsecondary sector’s attitude toward basic cognitive outcomes. While institutions are aware that literacy and numeracy are important skills, there is often little systematic approach to developing them further in PSE. Basic cognitive skills are seen to be a prerequisite for PSE but not necessarily an outcome of it, with the value-added of postsecondary coming instead with higher-order skills. This thinking is reflected in the college sector’s tendency to administer literacy and numeracy tests to incoming cohorts, so students needing remedial attention can be identified early on. In the university sector, meanwhile, explicit basic cognitive skills instruction is typically limited to remedial settings. Exit testing is rare at both levels for the same reasons (Dion, 2014). This lack of emphasis on basic cognitive skills in PSE can be linked, at least in part, to the ambiguities of the relevant qualifying frameworks.

This state of affairs is not unique to Canada. In the American postsecondary system, the definition and position of basic cognitive outcomes are just as blurred. Some institutions incorporate literacy and numeracy development into general education courses. Others offer (and in some cases require) intensive courses in writing, analytic reading and mathematics to be completed within the first year of study as a way of preparing students for discipline-specific work (Ewell, 2012). Postsecondary policy frameworks offer little direction either way: American institutions have long relied on standardized admissions tests to guarantee sufficient literacy and numeracy skill levels among incoming students, and policymakers have only recently begun to pay serious attention to research disputing the accuracy and validity of those measurements (Hiss & Franks, 2014). Both the Lumina Foundation’s Degree Qualification Profile and the National Leadership Council for Liberal Education and America’s Promise’s (LEAP) College Learning for the New Global Century clearly outline basic cognitive outcomes for the postsecondary level, but these documents are informative rather than binding (LEAP, 2007; Lumina Foundation, 2011). As in Canada’s PSE sector, American colleges take no systematic approach to developing basic cognitive outcomes and are not motivated to do so by existing postsecondary policy.

In the European Union, on the other hand, the significance of basic cognitive outcomes is supported by the Joint Quality Initiative’s Dublin Descriptors. The descriptors, like much of the policy work that grew out of the Bologna Process, emphasize skill- or discipline-specific rather than general education. As a result, basic cognitive outcomes are typically embedded within courses, programs and institutions, and delivered in the context of a student’s chosen field or profession (Krueger & Kumar, 2003). This ensures that programs across the EU approach basic cognitive outcomes consistently, regardless of the institution or jurisdiction.

1.2 Basic Cognitive Outcomes and Postsecondary Assessment

While conceptual and structural clarity lay the groundwork for thorough learning outcomes assessment, a variety of tools already exists to assess basic cognitive outcomes at different points across the learning continuum. Standardized tests remain popular methods of gathering large sets of data to determine whether institution- and system-wide literacy and numeracy standards are being met. Though tests like the Education Quality and Accountability Office’s (EQAO) provincial assessment program have long been used at the K-12 level, only a handful of Canadian postsecondary institutions use standardized tests to measure basic cognitive skills. In Ontario, this most often occurs in the form of pre- and post-admission testing.

Depending on the program in which a student has enrolled, they may be required to demonstrate their literacy or numeracy skills or, in the case of students whose first language is not English or French, to write a fluency test such as TOEFL or IELTS. While 62% of Ontario colleges administer some form of post-admission writing assessment (Fisher & Hoth, 2010), only one university requires an undergraduate post-admission English proficiency exam (Dion & Maldonado, 2013). Exit testing at both universities and colleges is even less common (Fisher & Hoth, 2010).

Standardized testing is more deeply entrenched in the American education system than it is in Canada. In addition to well-known assessments such as the SAT, ACT and GRE, new measures have been developed with the learning outcomes approach in mind. In particular, the growing interest in measuring institutional accountability or 'value-added' is reflected in the Voluntary System of Accountability (VSA) program and its associated measures, including the Collegiate Learning Assessment (CLA+), the ETS Proficiency Profile and the College Assessment of Academic Proficiency (CAAP) (VSA, 2008; Liu, 2009; ACT, 2014b; Council for Aid to Education, 2014; ETS, 2014a).

Traditionally, American colleges have used standardized tests like the SAT, ACT and GRE to measure the basic cognitive skills of applicants. Tests are usually made up of multiple-choice mathematics, vocabulary and reading comprehension components, with an open-ended essay question used to evaluate writing skills (ACT, 2014a; College Board, 2014; ETS, 2014b). These tests have been used as educational benchmarks and high scores are considered to indicate that a student has the appropriate literacy and numeracy skills to enter PSE. However, the comparability and validity of outcomes data obtained through standardized testing is often contested, and a national debate has emerged in recent years about the impact of America's high-stakes testing culture on educational outcomes. Both the SAT and ACT will launch updated versions with new indicators in 2016, which are intended to capture the skills of incoming college students more accurately (ACT, 2014c; Ryan, 2014).

When it comes to assessing literacy and numeracy at the postsecondary level, American colleges have several options available to them. Most of these standardized measures are similar in format to the SAT and ACT, though with lower stakes. The College BASE test includes both essay and multiple-choice questions to evaluate students' literacy and numeracy outcomes (University of Missouri Assessment Resource Center, n.d.). The ETS Proficiency Profile and the ACT function similarly, though institutions can choose whether or not to include the essay component (VSA, 2008; ACT, 2014a; ETS, 2014a). Other mixed-format tests include the CAAP and the National Assessment of Adult Literacy (NAAL) (VSA, 2008; Cutilli, 2009; ACT, 2014b; U.S. Department of Education, n.d.-a). Available reporting features can influence an institution's choice of test, depending on whether outcomes are being measured at the individual, institutional or international level, and depending on whether the data will be used to assess personal proficiency or to inform institutional change. As we have mentioned, however, there is no systematic postsecondary assessment program for basic cognitive outcomes, and institutions are free to choose whether or not to administer such a measurement in the first place.

International assessments, such as the OECD's Programme for International Student Assessment (PISA) and Programme for the International Assessment of Adult Competencies (PIAAC), help to make up for some of the inconsistencies present in outcomes assessment at the institution level. PISA and PIAAC generate massive data sets through common indicators, such that the information collected can be used to evaluate the health of education systems and inform policy directions. These assessment programs are motivated in part by the evidence linking basic cognitive proficiency to improved economic standing, as well as the "need

to align higher education outcomes in key areas across borders in a time of growing graduate mobility” (Ewell, 2012, p. 37).

International assessments face challenges with regard to the relevance of the tests to participants and the usefulness of the data collected. Since international assessment data are intended for high-level analysis and planning, individual scores are not normally made available to participants. It is also difficult to measure and compare student outcomes across regions that do not necessarily have the same educational and technological infrastructure. Even given these methodological concerns, international assessments reliably produce one important effect: with every reporting cycle, these measurements return literacy and numeracy to the forefront of the national conversation about education.

1.3 Summary

Strong literacy and numeracy skills have been linked to many positive outcomes in life, including increased wages and labour market participation. Despite this, more work needs to be done at the postsecondary level to conceptualize literacy and numeracy as skills in their own right rather than as ‘background’ skills required for higher-level disciplinary work. This lack of focus is facilitated by the unclear position allocated to basic cognitive skills in policy frameworks.

Those who do wish to assess basic cognitive skills at the postsecondary level will find a number of reliable tools at their disposal, especially for the assessment of students entering a course of study. Fewer tools are available to measure the value-added of a postsecondary education.

2. Discipline-specific Learning Outcomes

Basic cognitive learning outcomes address the skills students need in order to process complex information and develop specialized skills. This learning, which has traditionally been the focus of PSE, can be broken down further into a range of discipline-specific learning outcomes. Discipline-specific outcomes determine whether or not a student has acquired the particular abilities required for success in their chosen field of study. Although many discipline-specific outcomes have long histories, there is still much debate about how they should be assessed.

Discipline-specific learning outcomes are stated most explicitly in professional programs, such as engineering and medicine, where accreditation standards exist and mirror these outcomes (Tamburri, 2013). This type of outcome also surfaces in non-professional programs that clearly align with specific careers or sectors. In these instances, discipline-specific outcomes are often informed by jurisdictional accrediting bodies, partner institutions and/or program advisory committees representing relevant employers. The articulation of discipline-specific outcomes is common practice at the college level, where most programs of instruction, professional or not, are tied to specific careers or industries. But it is also increasingly common in non-professional university programs, where discipline-specific outcomes are used to clarify program structure and ensure educational quality.

While discipline-specific outcomes can improve the structure and coherence of a program, their external functions are not limited to defining career pathways. With the increase in international student mobility, institutions are placing greater emphasis on credit transfer. Discipline-specific outcomes have emerged as a

means of recognizing learning across jurisdictions, and as North American institutions look to attract foreign students, many colleges and universities have adopted discipline-specific learning outcomes as a means of remaining competitive with the world's leading institutions (Tamburri, 2013, Feb. 6). The following sections cover some of the processes used to articulate and assess discipline-specific learning outcomes.

2.1 The Tuning Process

In many ways, Europe's Tuning process has served as the catalyst for the international interest in discipline-specific outcomes. This initiative emerged in the wake of the Bologna Accord in 1999 as a means of ensuring the mobility of credentials and the consistency of quality standards across EU countries. Learning outcomes developed by the Tuning process can be mapped through all levels of a program or credential, ensuring alignment, accountability and clear direction for curriculum development (Lennon et al., 2014; Tuning USA, 2014). The Tuning process, which involves gathering advice from subject matter and policy experts, has since been exported successfully to postsecondary systems in Latin America (2005), the United States (2009), Russia (2011), Africa (2011), Australia (pilot study 2010) and Canada (2011) (Institute for Evidence-Based Change, 2012; Yopp & Marshall, 2014).

Although these Tuning projects have similar purposes – to define what a student should know and be able to do upon completion of a postsecondary program in a given field – the approach to developing learning outcomes and the level of specificity of these outcomes varies in each context. While the Tuning process in Ontario, which was coordinated by HEQCO, created general learning outcomes that suited a range of sectors and disciplines, the LTAS project in Australia tailored learning outcomes to each discipline (Australian Learning & Teaching Council, 2011; Lennon et al., 2014). In addition, the reasons for launching a Tuning process vary across jurisdictions. The European Tuning process was driven by the need for credentials that would be recognized across national borders, while demands for institutional accountability and clear educational objectives motivated the process in Latin America (Beneitone et al., 2007; González & Wagenaar, 2008; IEBC, 2012).

2.2 Assessment and Quality Assurance

Postsecondary institutions have developed a variety of means of assessing discipline-specific learning outcomes, due in part to increased emphasis on quality assurance and institutional accountability (Brawley et al., 2012). Instructors use tests, assignment rubrics, checklists and observation, among other tools, to assess discipline-specific skills across a broad range of fields (Heiland & Rosenthal, 2011). These tools are particularly suited to formative learning as they can help students identify their weak spots in relation to the program outcomes, making it easier to formulate improvement strategies.

Brawley et al. (2012) describe a three-step process for assessing discipline-specific learning outcomes:

1. Identify the outcomes for a specific discipline or program of study
2. Evaluate the program's delivery of the intended learning outcomes (quality assurance)
3. Utilize the results from the evaluation to improve the program's ability to meet the standards set out by the learning outcomes (quality improvement)

Ideally, assessment involves both a quality assurance and a student improvement dimension. As mentioned above, discipline-specific outcomes in professional programs are assessed regularly by accrediting bodies (Tamburri, 2013). Although accreditors have traditionally been concerned with improving curricula and pedagogy, there has been a recent shift towards using quality assurance frameworks to ensure that professional standards are being met (Ewell, 2009). External stakeholders and employers in particular want evidence that graduates are equipped to join their respective professions. Regular assessment programs for discipline-specific learning outcomes can help to maintain stakeholder confidence in the quality of professional training programs.

Value-added assessments such as the CLA+ or VSA, which calculate the difference between students' expected performance and actual performance, can be used for quality assurance if faculty and administrators respond to apparent areas of weakness and/or promising practices. Similarly, in-class assessments can be used for both summative and formative purposes, providing instructors with an idea of students' skill levels while using those findings to guide lesson content (Ewell, 2009). However, quality assurance exercises do not necessarily coincide with student improvement unless deliberate efforts are made to 'close the loop' by adjusting teaching and learning strategies in response to assessment results.

2.3 Assessment and Student Achievement

While there is growing consensus about the value of assessing students' skills, there is considerable debate about whether some skills can or should be assessed in discipline-free contexts, leading scholars to ask whether every learning outcome should be viewed as a discipline-specific outcome.

Learning outcomes are meant to describe student performance. Proponents of discipline-specific assessment are typically of the opinion that the context in which a student is meant to apply a skill is an integral part of the skill itself. That is to say, in some cases, outcomes should be assessed in the same context in which a student develops them. This is because in highly discipline-specific programs, the discipline comes to serve as a frame of reference and knowledge base upon which students draw when applying certain skills. The frame of reference provides the standard for measuring the quality of a student's performance. Skills can be measured outside of discipline-specific contexts using generic standards, but such assessments may be more limited in their ability to capture students' skill levels accurately (Brooks, 2011; Heiland & Rosenthal, 2011; Barrie, Hughes, Crisp & Bennison, 2014; Christodoulou, 2014).

For this reason, it is not necessarily appropriate to employ generic skills assessments if student performance on these assessments is contributing to course grades or other components that could negatively impact graduation and eventual participation in a given profession. At the same time, it is not always practical to assess outcomes in discipline-specific contexts, particularly when assessments target very large populations. This is why some of the programs measuring skill levels at the regional, national or global level employ generic assessments, like the PIAAC. The purpose of such assessments is to generalize about all undergraduates or all adults living in a region, and context-free measurements are used to ensure that the data collected will be reasonably comparable. These types of assessments are typically formatted as standardized tests, with components measuring students' application of generic skills in everyday situations. For the same reasons, individual results are not made available, so that an individual's performance does not negatively impact a student's academic performance or career prospects.

The debate around assessing learning outcomes in discipline-specific contexts is far from over. Proponents of context-free assessment are often concerned, with good reason, that singular focus on discipline-specific learning outcomes could come at the cost of students' ability to transfer learning beyond the bounds of their areas of specialization (Benjamin et al., 2012). The present challenge for assessment, then, is to strike an appropriate balance between discipline-specific learning outcomes and the higher-order cognitive and transferrable skills domains.

The International Assessment of Higher Education Learning Outcomes (AHELO) is a rare example of a large-scale assessment that takes the significance of discipline-specific learning into account. In addition to assessing generic skills like literacy and numeracy, AHELO has piloted discipline-specific components for students in economics and engineering programs (OECD, 2014b). As AHELO's pilots demonstrate, discipline-specific assessments need not be restricted to content knowledge; rather, measurements can be constructed that assess the application of knowledge to solve discipline-specific problems (Lennon & Jonker, 2014).

This is not to suggest that context-free assessments do not serve an important purpose. Generic assessments can provide data to inform employers of students' skills, encourage institutional accountability and direct policy for postsecondary systems as a whole (Barrie, 2014). In addition to the CLA+ and the PIAAC, there are many other instruments, such as the Australian Graduate Skills Assessment (GSA), which assess basic cognitive and higher-order cognitive outcomes using a discipline-free approach (Australian Council for Education Research, 2014). These tests provide much needed information but "very little is being written about what tests of generic skills are actually measuring and with what accuracy" (Barrie, 2014).

2.4 Summary

To the extent that they are mirrored in accreditation standards, discipline-specific learning outcomes create clear pathways from PSE to the labour market in professional disciplines. Through initiatives such as the Tuning process, many institutions are using discipline-specific outcomes to provide quality assurance, improve student mobility and smooth transitions into the workforce. The unique structure of discipline-specific outcomes raises questions for assessment with regard to whether quality assurance and student achievement can be measured at the same time and whether it is appropriate to assess discipline-specific outcomes in a generic context. However, the long history of discipline-specific learning outcomes as a clear focus of postsecondary institutions allows them to benefit from a level of clarity that the other categories of learning outcomes, including higher-order cognitive outcomes, are not afforded.

3. Higher-order Cognitive Outcomes

Higher-order cognitive skills include critical thinking, problem solving and communication (Weingarten, 2014, Feb. 13). Employers have been vocal about the need to teach students how to analyze complex information, make credible judgments and arrive at effective solutions; these abilities are highly valued in almost every line of work (Benjamin et al., 2013; CCEO, 2013; Borwein, 2014). In PSE, the drive to advance higher-order cognitive outcomes comes from professional and less career-specific programs alike. Highly discipline-specific programs such as engineering recognize the need for future professionals to be able to make sound, responsible decisions, while general arts and science programs view higher-cognitive outcomes as skills that can help graduates transition into a variety of careers (WNS, 2009; Kaupp, Frank & Chen, 2014).

Although the learning outcomes approach helps educators and students identify and develop higher-order cognitive skills, critical thinking, problem solving and communication are often considered to be among the most difficult outcomes to define, teach and assess.

3.1 Defining Higher-order Cognitive Outcomes

Most credential frameworks and degree profiles ascribe great importance to higher-order cognitive outcomes. However, at present, there is no standard way of framing them. We can take critical thinking, one of the most often discussed yet also one of the most ephemeral of higher-order cognitive outcomes, as an example here. The COU's Degree-Level Expectations embed critical thinking across a number of categories, while the Lumina Foundation and the LEAP Initiative both group it under the banner of 'intellectual skills' (National Leadership Council for Liberal Education & America's Promise, 2007; COU, 2011; Lumina Foundation, 2011). Though Lumina and LEAP share a general approach to describing 'intellectual skills,' they break this category down further into component parts. These examples point to a much broader trend in the higher-order cognitive domain: stakeholders recognize the value of critical thinking, problem solving and communication skills, but there is no consensus on how to conceptualize them, much less how to assess them.

In this sense, the challenge we face here is the opposite of the situation with respect to basic cognitive outcomes. Basic cognitive outcomes appear to be undervalued in PSE, though educators understand quite well how to teach and assess literacy and numeracy skills. In contrast, higher-order cognitive outcomes are highly valued, but we lack agreement on definitions. Both sets of circumstances produce similar effects: institutions respond to these gray areas by developing their own concepts and interventions for assessment, but these are difficult to translate across contexts, which in turn can affect the quality and cohesion of PSE within the sector as a whole.

Although we identify critical thinking, problem solving and communication skills as distinct higher-order outcomes, the differences between them are unclear. For example, as we noted earlier, literacy as a basic cognitive skill and communication as a higher-order skill can be challenging to differentiate. Critical thinking, meanwhile, is difficult to define clearly and to link to demonstrable behaviours. One option has therefore been to understand problem solving and communication skills as components of critical thinking, as tools one uses to resolve situations or convince others that one's argument is sound (Benjamin, 2013). This argument has failed to convince everyone, however, and critical thinking remains a vague concept. This makes it difficult to use in learning outcomes assessments and frameworks, because institutions and programs interpret it a number of different ways. Since one goal of the learning outcomes approach is to create a common language of skills and abilities linked to demonstrable outcomes, critical thinking and other higher-order cognitive skills pose a particular challenge.

3.2 Assessing Higher-order Cognitive Outcomes in PSE

A number of measurements approach higher-order cognitive outcomes through problem solving and communication skills, since the definition of critical thinking is much disputed. The CLA+, for instance, calculates critical thinking scores based on the quality of analytic reasoning, problem solving and communication skills reflected in participants' written responses to case-based tasks (Benjamin, 2013). Even so, others have contested that this holistic approach fails to account for other components of critical

thinking, such as informal logic (Possin, 2013, Feb. 21). For while critical thinking may remain a vague concept, we do know that students can be taught component skills like analytic reading, dissecting arguments, differentiating between deductive and inductive reasoning, and so forth. The challenge for assessment lies in striking the right balance between known factors and other less well-defined components.

How then can communication and problem solving be assessed? The following discussion highlights some of the better-established measures used in PSE.

3.2.1 Taxonomies

The use of clear, consistent terminology when writing and implementing learning outcomes is essential to both their effectiveness as instructional tools and their alignment within a course or program. For this reason, taxonomies such as Bloom's and SOLO are popular ways of indicating hierarchies in skill development, progressing from basic to more sophisticated cognitive processes (Kratwohl, 2002; Potter & Kustra, 2012). Taxonomies often recommend the use of specific verbs to sort outcomes by level of complexity, with some activities, such as listing or describing, operating at a lower level of skill than others, such as analyzing or evaluating. These allow for the creation of clear hierarchies of learning outcomes and can help chart the progression of student learning through a course of study.

3.2.2 Rubrics

Rubrics can provide students with detailed, formative feedback on the level of rigour displayed in their completion of a given assignment and make transparent the level of skill expected of students. Rubrics are popular tools for assessing outcomes of all kinds, including higher-order skills. However, as they rely primarily on the judgement of instructors, rubrics can be time-consuming to design effectively and unreliable when applied to large classes or samples. Nevertheless, the Association of American Colleges & Universities (AAC&U) VALUE Rubrics, developed as part of the AAC&U's LEAP initiative, are gaining traction as useful measures of higher-order cognitive outcomes that can be tailored to reflect discipline-specific requirements (AAC&U, 2014).

3.2.3 The Collegiate Learning Assessment (CLA+)

The CLA+ uses open-ended, case-based written assessment tasks to measure how well students "formulate hypotheses, recognize fallacious reasoning, and identify implicit and possibly incorrect assumptions" (Benjamin, 2013, p. 3). In doing so, the CLA+ eschews the multiple-choice format usually preferred by commercially available standardized tests because, according to the creators of the instrument, students do not necessarily have to exercise their critical thinking capacities to choose between a set of possible answers (Benjamin, 2013). Instead, the CLA+'s open-ended format provides students with a short case study that mirrors complex, real-world problems. Since students are given all of the information they need to analyze the case, and the tasks are presented in a variety of contexts, the CLA+ claims to measure the communication and problem solving skills regardless of discipline (Benjamin, 2013).

However, it has been argued that the CLA+'s lack of discipline-specific context ignores the extent to which prior subject-area knowledge and problem-solving experience factor into a student's critical thinking process

(Banta & Pike, 2012). This may cause students from some programs, especially those in which critical thinking is taught through simulations, case studies and problem-based learning, to underperform on what is primarily an exercise in close reading and written analysis. Additionally, others have suggested that the CLA+'s emphasis on a holistic conception of critical thinking overlooks the significance of informal logic and critical thinking strategies (Possin, 2013, Feb. 21). This criticism is levelled primarily at the validity of the CLA+'s assessment scores rather than at the test itself, since the CLA+ implicitly includes these skill components. The implication of this oversight, however, is significant: since components of critical thinking are not included in the scoring matrix, the CLA+ may be a better measure of rhetorical skills than of critical thinking proper.

3.2.4 High-impact Practices and the Wabash National Study of Liberal Arts Education

The Wabash National Study of Liberal Arts Education (WNS) is a broad-based longitudinal study of liberal arts outcomes, including critical thinking. The study launched in 2006 at Wabash College's Centre of Inquiry in the Liberal Arts, with 19 participating institutions. Since then, the WNS has grown to include 49 institutions and over 170,000 postsecondary students. The WNS tracks sample cohorts at each institution for at least four years, with the intention of measuring learning outcomes in terms of student development rather than institutional goals (WNS, 2009). The WNS is notable for its efforts to understand how high-impact teaching practices affect the development of specific outcomes and whether different student demographics experience the effects of these strategies differently (Pascarella & Blaich, 2013). The study is one of very few longitudinal outcomes assessment projects that offer rare insight into the development of higher-order cognitive outcomes over time.

Students are tested three times – in the fall and spring of their first year of study and in the spring of their final year. Student surveys are administered alongside several different standardized assessments to establish benchmarks and rates of change. Assessment data are then triangulated with demographic, course, program and institutional information to create highly detailed data sets that, ideally, will be used to inform future policy and program directions (Blaich & Wise, 2011).

Given the richness of the data collected for the WNS, the results to date have been quite nuanced. This is especially true of the findings related to high-impact practices. It comes as no surprise that high-quality teaching and deep learning experiences have been found to impact cognition positively in ways that may extend beyond academic performance. At the same time, the WNS data sets were found to contain numerous conditional effects, particularly when results were broken down by race, gender, family income and pre-college ability. In some cases, practices that were linked to strong cognitive gains for one demographic group generated no significant statistical difference for another. Interactional diversity – exposure to different social and cultural viewpoints – was the only high-impact practice to foster four-year growth in critical thinking in the overall WNS sample. However, the net gains related to this practice were almost wholly accrued by white students, and white males in particular, with female students and African-American students reporting a considerably weaker impact (Pascarella & Blaich, 2013). The prevalence of demographic conditional effects in the first round of data underscores the fact that critical thinking skills develop in highly personal ways. This is among the WNS's most valuable insights into the assessment of higher-order cognitive outcomes.

3.3 Summary

Critical thinking is highly valued in PSE but notoriously difficult to capture in learning outcomes. Although we know that it is closely linked to other higher-order cognitive skills, we do not yet have a strong understanding of how it operates. Yet critical thinking is widely cited in learning outcomes frameworks, which use varying definitions and leave much room for interpretation.

Since critical thinking is such a vague concept, we focus on those instruments that measure it indirectly through problem solving and communication skills. But as our discussions of the CLA+ and the Wabash National Study illustrate, it is difficult to find assessment measures that allow students to draw upon their disciplinary knowledge base and frames of reference. The WNS also demonstrates the extent to which personal experiences affect critical thinking abilities. Since much of critical thinking occurs invisibly, without being linked to its own discrete and observable behaviours, problem solving, communication and analytical skills like informal logic still seem to be the most promising roads to access the teaching and assessment of higher-order cognitive outcomes.

4. Transferrable Skills Outcomes

Transferrable skills are “prime qualities that make and keep us employable” (Goleman, 1998, p. 4). These outcomes can help students succeed not only academically but professionally and personally as well (Weingarten, Feb. 13, 2014). ‘Transferrable’ reflects the fact that these skills are thought to be generic and applicable across a range of activities, though transfer is not necessarily automatic and adaptation may be required (Jackson, 2013). Students need to understand how and when transferrable skills can be used to their advantage, both within their fields of study and on the labour market.

4.1 The Transfer Process

Stakeholders sometimes equate transferrable skills with graduate employability, which presupposes that the generic nature of such skills makes them valuable and applicable in any professional context. However, some researchers argue that this equation neglects to take learning transfer into account as a distinct stage in the skill development process (Cameron et al., 2011; Jackson, 2013). Many of the key premises of learning transfer can be used to illuminate the nature of transferrable skills and learning outcomes. Specifically, questions of metacognition – how and why we think and act the ways we do – can help explain the ‘how’ and ‘when’ of learning and skill transfer.

Metacognition refers to “the mind’s ability to reflect on how effectively it is handling the learning process” (Conley, 2013, Jan. 22), the ability to “stop and think” or “step back and reflect” (Behar-Horenstein & Niu, 2011). These descriptions position metacognition at the heart of the higher-order cognitive processes. Our problem solving and communication activities are functions of our ability to think critically and ask questions – that is, our capacity for metacognition. But metacognition is also central to transferrable skills, which are essentially tools and techniques that we use to navigate between and engage with various situations (Conley, 2013, Jan. 22). Our ability to transfer learning is what sets the basic cognitive, discipline-specific and higher-order cognitive domains in motion.

Transferrable skills help us to leverage our learning and frames of reference to apply our skills in unfamiliar contexts. When employers look for flexibility, resourcefulness and adaptability, they are naming transferrable outcomes that can ease the transition from school to work. Yet these qualities are far from simple to teach and assess. Transferrable outcomes depend as much on personality as on curriculum. Just as some students might display a knack for mathematics while others might require additional supports, some students are inclined to work well in teams while others need to develop this skill.

Much of the current research on learning transfer employs case studies and problem-based learning activities to allow students to test their skills and judgment in different environments (Jackson, 2013). Such activities teach students to identify ‘situational cues’ that trigger memories of related learning experiences. Through practice, immersion and repetition, students are encouraged to draw upon previous knowledge and experience when making decisions or choosing courses of action in new situations. These exercises are commonly used in discipline-specific programs like medicine and engineering, where professional standards govern performance and where the margin of error on the job is small.

Given the challenge of teaching and assessing transferrable skills outcomes in PSE and the lack of rigorous research on how these outcomes can be met, we turn to qualities that are thought to be strong indicators of eventual skill transfer and effective transferrable skills outcomes: creativity and grit.

4.2 Creativity

Creativity is the ability or tendency to look for innovative or unconventional relations between things or concepts. This eye for the novel may be an indicator of skill transfer, in that it could help students gain the flexibility needed to apply their knowledge and skills to unfamiliar situations. There is thus growing interest in using creativity, rather than intelligence quotient (IQ), as an indicator of intellectual potential (Bronson & Merryman, 2014, Jan. 23).

The Torrance Test of Creative Thinking (TTCT) has done much to stimulate this area of study. For more than 50 years, the TTCT has been the subject of a longitudinal study on creativity and intelligence. The study reports a strong positive correlation between high TTCT scores and achievement in high school, peer nomination and creative activities (Runco et al., 2010). Although personal experiences and motivation do influence TTCT outcomes, the findings have been reasonably consistent throughout the course of the study, with the most recent analyses (2010) reporting a statistically significant trend linking personal achievement and creativity.

The TTCT study findings are not alone in linking creativity to improved educational outcomes. As advocates of problem-based learning and open-ended performance tasks report, there are opportunities for “deep learning” wherever students are encouraged to work across different points of view (American Institutes for Research, 2014; Hoidn & Kärkkäinen, 2014; Kaupp, Frank & Chen, 2014). In fact, teaching and assessment strategies that encourage students to use their imagination and think from others’ perspectives are excellent means of developing transferrable and higher-order cognitive outcomes. Not only does critical thinking inherently involve a sort of feedback loop with imagination, but the ability to consider others’ perspectives is important for transferrable skills like good citizenship, flexibility and teamwork (Pascarella & Blaich, 2013). Creativity can be viewed as the ‘motive power’ that animates and exercises these skills.

The learning outcomes approach has not yet managed to translate psychological research on creativity into a viable approach to this skill for PSE, though strong interest exists in doing so. While researchers have developed measures of creativity like the TTCT, it is not clear if it is appropriate or effective to apply clinical assessments to educational settings. Additionally, questions remain as to how fair it is to hold institutions accountable for creativity outcomes. While there is much work to be done in this area, we can at the very least recognize the role creativity plays in developing transferrable skills outcomes and use this knowledge to advance our assessment resources.

4.3 Resilience and Emotional Intelligence

Creativity is only one quality underlying successful skill transfer and the development of transferrable skills. In recent years, there has been increased interest in applying psychological research on resilience, or “the capacity of the person, family, or community to prevent, minimize, overcome, or thrive in spite of negative or challenging circumstances,” to the learning outcomes approach (Wagnild & Young, 1993). Resilience is also sometimes referred to as ‘grit,’ though the working definition of grit used by researchers in the field like Duckworth only describes one narrow aspect of how resilience operates (Duckworth et al., 2007).

Nearly all of the research on resilience has focused on measuring and developing it in early childhood or for members of at-risk or marginalized groups. Little work has been done on how resilience can be taught and assessed in the general postsecondary student or adult population because resilience only emerges in relation to risk. Even then, the grit a person might display in response to the situation will be composed of a number of often idiosyncratic factors, which can vary each time person is called to display resilience (Gardner et al., 2010; Prince-Embury, 2013).

Nevertheless, the so-called ‘grit factor’ has proven to be an attractive concept to parents and educators alike. A student’s willingness to put time and effort into meeting challenges and solving problems has been shown to have an impact on their eventual success in PSE. When risks and goals are clear, as in competitive contexts like the Scripps National Spelling Bee or like military training, resilience can be measured by persistence and motivation (Duckworth et al., 2007; Eskreis-Winkler et al., 2014).

Still, the concept of grit has its limits. Some educators and policy experts have criticized the focus on resilience for minimizing the effect that students’ circumstances have on their learning (Tough, 2013). By perpetuating what is in effect a recasting of Weber’s “Protestant work ethic” or the virtues of “pulling oneself up by the bootstraps,” those wishing to integrate resilience into pedagogical practice need to be aware of the vast bodies of research showing that at-risk students also tend to benefit from remedial interventions and personalized approaches to education, particularly at the postsecondary level (Socol, 2013; Tough, 2013; Lichtman, 2014; Socol, 2014; Thomas, 2014; Warner, 2014). We should not assume that ‘sticking to it’ is always enough to achieve an objective or neglect the mitigating role that personal circumstances can play, but there is always room for improvement. Just as some people are better runners than others, virtually anyone can, with training and support, work up to a level of fitness that improves or sustains their health and endurance.

At present, the PSE sector has no systematic approach to resilience. Those institutions that do assess resilience outcomes typically do so in a counselling or advisory services setting, and only for members of at-risk or underrepresented groups who access their supports. This means that unlike critical thinking, for

which we have both established teaching strategies and large-scale assessment tools like the CLA+, resilience has yet to be studied and assessed in classrooms at the level of the average postsecondary student's educational experience. Resilience presents additional problems for assessment insofar as it is not only demonstrated in response to risk, but also over long periods of time. This means that performance tasks like the Academic Diligence Task, which measures individual differences in diligence on tedious but important work (Galla et al., 2014), miss the point somewhat – our understanding of resilience has expanded considerably beyond historical descriptions of 'toughing it out' and 'bouncing back' in the face of adversity. Though we have a large body of psychological research and psychometric measurements, we need to determine whether these tools can be adapted for use outside of counselling and advisory services (Windle, Bennett & Noyes, 2011).

4.4 Summary

The postsecondary sector has yet to demonstrate interest in developing and assessing transferrable skills outcomes (Weingarten, Feb. 13, 2014). Still, these skills are just as valuable to postsecondary students as they are to early learners, and pre-school and school readiness programs in Canada have long used measures such as the Early Development Index to help children with diverse needs successfully transition to kindergarten. Ontario's K-12 sector is also beginning to recognize the importance of transferrable skills for student success: in February 2014, People for Education launched the Measuring what Matters project, a multi-year initiative developing educational outcomes for creativity, citizenship, health, quality learning environments and social-emotional skills (People for Education, 2014). As such, PSE may be able to expand on the work of the early childhood and K-12 education sectors to develop and assess transferrable skills outcomes.

Basic cognitive and disciplinary outcomes allow students to navigate the world, while higher-order cognitive outcomes allow them to engage it critically. Transferrable skills outcomes, however, transcend language and discipline. These capacities help us adapt our learning to different situations and thus carry it from the classroom to the labour market and beyond. While we know little about how to teach and assess transferrable skills at the postsecondary level, we understand some of the underlying phenomena – learning transfer, creativity and resilience. We also know that we begin developing these skills early in life, so we can look to the ways transferrable outcomes are assessed in early learning, elementary school and secondary school as we develop measures that are appropriate for PSE.

5. Concluding Remarks

Postsecondary education has reached a critical impasse. Structurally speaking, the Canadian system does not look much different than it did 50 years ago. But the system's dynamics have changed considerably: reduced government funding and the tough economic climate make efficient financial models a necessity for healthy institutions; student debt loads are increasing and yet clear pathways from school to work are far from the norm; and the student body is increasingly diverse, with growing numbers of international students, students from historically underrepresented groups, mature students returning to PSE to improve career prospects, and students having to work at least part-time to manage the cost of education. To ensure that our system is accountable, accessible and of the highest quality, we need to define and assess the outcomes of education at the institutional and student levels.

HEQCO's primary contribution to this goal thus far has been to propose a typology including four different classes of postsecondary learning outcome appropriate to the Ontario context: basic cognitive skills, discipline-specific skills, higher-order cognitive skills and transferrable skills. Together, these categories can be used to guide postsecondary outcomes assessment and, in doing so, create a shared foundation for postsecondary learning quality. This report has demonstrated, however, that the definition and assessment of learning outcomes within these four categories is not without its complications. For example, while literacy and numeracy have widely been acknowledged as basic cognitive skills linked to positive outcomes later in life, including increased wages and labour market participation, the postsecondary sector has often viewed them as a prerequisite for PSE rather than a group of skills to be developed in PSE. More work needs to be done to conceptualize literacy and numeracy as skills in their own right rather than as 'background' skills required for higher-level disciplinary work at the postsecondary level. This lack of focus is facilitated by the unclear situation of literacy and numeracy in the various provincial qualifications frameworks.

Discipline-specific skills face the opposite problem. Disciplinary knowledge has long been the focus of a postsecondary education, often to the exclusion of any other type of skills. The challenge here lies in assessing discipline-specific skills in a manner that gives them their due but also strikes a balance with other types of skills. A debate also rages about whether discipline-specific skills can be assessed in non-disciplinary contexts. Overall, however, discipline-specific skills possess a lengthy history and thus a level of clarity from which the other categories of learning outcomes do not benefit.

The conceptualization of higher-order cognitive skills requires that we determine where basic cognitive skills end and more advanced skills begin. Higher-order cognitive skills can be particularly difficult to capture in learning outcomes as they often are not linked to discrete, observable behaviours and thus are difficult to assess. The general emphasis on these outcomes in PSE, however, has led to the creation of a wide range of definitions and in turn a variety of assessment tools based on these different definitions. The vagueness of these skills thus makes for especially murky waters. A common resolution has been to break higher-order cognitive skills into its component parts – viewing critical thinking as made up of communications and problem solving skills, for example – and focusing assessment on these components instead.

Finally, transferable skills outcomes have long been assessed in early childhood education but have yet to become common in the learning outcomes discussion at the postsecondary level. Their importance is obvious, however, as they allow students to apply their skills in a variety of contexts, thus easing the transition both into and out of PSE. While we know little about how to teach and assess transferrable skills at the postsecondary level, we understand some of the underlying phenomena – learning transfer, creativity and resilience – and we can look to outcomes assessments used in early life for inspiration in PSE.

If implemented properly the learning outcomes approach can serve the purposes both of accountability and quality measurement. However, it is not enough to revise policy infrastructure and map outcomes across credentials. In order for a system to be truly outcomes-based, we need to prove that students are graduating with the skills they need to succeed. Assessment remains the keystone of the learning outcomes approach at the postsecondary level, though it is not always taken seriously. If given proper consideration, learning outcomes assessment could be an invaluable source of strength and flexibility for a system in transition.

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