

## **Hunting and gathering: new imperatives in mapping and collecting student learning data to assure quality outcomes**

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### **Abstract**

Assurance of learning is a quality enhancement and quality assurance process used in higher education. It involves a process of determining program learning outcomes and standards, and systematically gathering evidence to measure student performance on these. The systematic assessment of whole of program goals provides a basis for curriculum development, continuous improvement, and accreditation. To better understand the key elements of assurance of learning processes, a study of Australian Business School practices was undertaken. Interviews with Business School representatives (n=25) highlighted two key processes: 1) mapping of graduate attributes; and 2) collection of assurance data. The findings indicate that external drivers such as professional accreditation and government legislation were the primary motivators for formally assuring learning outcomes. Secondly, the majority of institutions utilised an embedded approach to assuring learning to facilitate academic commitment. The development of sustainable and inclusive processes was identified as a major system change challenge.

**Keywords:** assurance of learning; curriculum mapping; student learning outcomes

The quality of business education standards in higher education has been a matter of much recent discontent and debate. Martell and Calderon (2009) cite growing public dissatisfaction with the quality of U.S. college education, and Hall and Kro (2006) argue that the growing number of working managers returning to the executive education is driving demand for better quality education. A recent U.K. Government White Paper, 'Students at the Heart of the System' (2011), set out the quality challenges of a changing higher education environment, recognising the need to strengthen the processes and to adapt and reinforce systems to improve practice. In Australia, the recently established Tertiary Education Quality and Standards Agency (TEQSA) identified the need to focus on quality improvements (TEQSA, 2011).

Determining the standards of student learning and the approaches to data collection against these standards is a complex task for academics and program administrators. Indeed, Coates (2010) not only acknowledges the complexity of assessing, monitoring and enhancing academic standards, but also stresses the need for cultural change in order to better facilitate the process. There have been a number of national approaches to measuring and documenting learning outcomes. In Brazil, for example, national course examinations have been in place since 1996, providing learning outcome data across numerous disciplines (cited in Coates, 2010); in the United States, the Collegiate Learning Assessment (CAE, 2009) has been adopted by over 400 universities to collect learning outcome results; Voluntary Systems of Accountability (VSA, 2009) have been implemented; and the Quality Assurance Agency (QAA) in the UK use external examiners to compare standards across institutions. However, Coates and Richardson's (2011) review of practice indicated that although there are various national approaches to assessing standards, there are few cross country examples.

The ways in which academic institutions and their programs can effectively utilise assessment data internally to inform and strengthen undergraduate education and externally to communicate with policymakers and other stakeholders is well documented (see Baker, Jankowski, Provezis and Kinzie 2012). However, research on “mapping” student learning (or attributes) throughout the curriculum in higher education is scant (Oliver 2010). The collection of learning outcomes data is the subject of much debate on what to collect (Freeman 2010) and how to collect it (Hager 2006). Further, according to Taylor et al, (2009) the systematic direct measurement of value-added graduate attainment in higher education is still relatively immature. This study explores these issues in the context of Australian higher education, complimenting the National Institute for Learning Outcomes Assessment (NILOA) project (Baker, Jankowski, Provezis and Kinzie, 2012) based in the US, which has been examining ways that academic programs and institutions can productively use assessment data internally to inform and strengthen undergraduate education, and externally to communicate with policy makers, families and other stakeholders.

### **Assurance of learning**

Assurance of learning is defined as the process by which educational institutions measure the learning outcomes of students against a specific set of program goals (Hall & Kro, 2006). These indicators of performance are frequently used to guide the strategic direction, priorities, and program enhancement processes as well as demonstrate student outcomes in learning to interested stakeholders.

Traditionally, indirect measures of learning such as student feedback together with enrolment and retention have provided the measures of quality assurance. In contrast direct measures of learning outcomes involve capturing, monitoring and evaluating data specific to

student achievements relative to specific program-wide<sup>1</sup> goals. Notably, De la Harpe et al.'s (2009) study on the implementation of assurance of learning and found that the integration of graduate attributes throughout the curriculum provided an effective method of developing quality through learning outcomes. Ideally, program goals are defined and operationalised, and the assessment measures selected fit with the goals determined for the program and the pedagogues used, as well as the circumstances of the institution (Zhu & McFarland, 2005).

Increasingly, generic student learning outcomes of students are measured in addition to discipline knowledge. Barrie (2005) suggests that measuring generic skills or attributes has become the logical extension of quality assurance. Additionally, many universities are required to make a public statement of graduate attributes as a requirement of government funding (Barrie, Smith, Hughes, & Thompson, 2009). Graduate attributes can be developed at different levels – university, faculty and program and can cover a range of attributes including discipline knowledge, generic skills and professional qualities.

The emphasis on developing graduate attributes, program learning outcomes and minimum standards across disciplines for assurance of learning has led to questions about process and methods. An Organisation for Economic Co-operation and Development (OECD) initiative on Assessment of Higher Education Learning Outcomes (AHELO) has trialled a tool to measure whether graduating students are equipped with the skills needed for the emerging job market. Piloted at over 250 institutions to date, in more than 16 countries, it aims to be internationally valid for use in diverse cultures, languages and tertiary institutions.

Standardised testing has been proposed in Australia (Australian Council for Educational Research, 2001) but the adoption of a generic test to measure learning outcomes/graduate attributes has been resisted by many (see Bath, Smith, Stein and Swann, 2007). Critics argue that generic testing has the potential to lead to a standardisation of

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<sup>1</sup> The term 'program' refers to a whole degree course.

programs and may fail to discern vital disciplinary nuances of application, and recognise the distinction between university programs.

### **Curriculum mapping**

Embedding learning outcome objectives or graduate attributes throughout a program to encourage different levels of learning is also known as curriculum mapping. This can be done to map suitable subjects to assess or assure graduate attributes or throughout the program. Termed a ‘scaffolded approach’ the latter method identifies where outcomes/attributes are introduced, developed and assured (Oliver, Jones & Ferns, 2008; Oliver & Tucker, 2004; Sumsion & Goodfellow, 2004) and has been found to better meet the needs of industry or the students (Uchiyama & Radin, 2009). Yorke and Knight (2006) support this meta-approach as more effective than focusing on what occurs in individual subjects. The usefulness of curriculum mapping is reinforced in the literature, as a means of identifying gaps in a program (Freeman, Hancock, Simpson, & Sykes, 2008) and to test how and where employability related learning is incorporated into a curriculum (Yorke & Knight as cited in Oliver, 2010, p. 10). Biggs (2003) suggests that curriculum mapping provides a means of monitoring course diversity and overlap as well as providing an opportunity for reflection and discourse to check on alignment between graduate attributes, course objectives and assessment.

Three considerations have been identified in the literature for effective curriculum mapping practice (Britton, Letassy, Medina, & Er, 2008; Harden & Hart, 2002; Uchiyama & Radin, 2009; Oliver, 2010). First is what Oliver (2010) describes as the “tool”. This is the instrument that allows the viewing of the program as a whole. Next is the process, which outlines how the tool is used by academics to map effectively. Finally there is the purpose, which provides the rationale for the mapping.

Some scholars caution that curriculum mapping that does not align assessment items with learning outcomes may lead to a compliance culture where academic staff do no more than ‘tick and flick’ as evidence of learning against graduate attributes, undermining the usefulness of curriculum mapping in the assurance of learning process (Barrie et al., 2009; Oliver, 2010). While others point to the focus of curriculum mapping on the ‘intended’ curriculum that is not always the same as the ‘enacted curriculum’ or the ‘experienced curriculum’ from the students’ perspective (Porter, 2004). According to Bath, Smith, Stein and Swann (2007), however, if the curriculum is aligned in the eyes of all the stakeholders then a ‘living’ curriculum can be developed.

### **Learning outcomes data collection**

The collection and provision of evidence of student achievements brings challenges in the design for efficiency and streamlining throughout the assurance of learning process (Freeman, 2010). Radloff et al. (2009) identified that clarity and support for assessment of learning outcomes and graduate attributes were important. Carew et al. (2009) found that rigorous evaluation of graduate attributes impact is rare.

The use of formative and summative assessment rubrics has been identified as key in collecting data on students’ capability (Yorke, 1998). Rubrics articulate explicit levels of criteria aligned with assessment outcomes and are intended to make expectations transparent and motivate students to focus on the intended learning (Mansilla, Duraisingh, Wolfe, & Haynes, 2009). The Value Project (Rhodes, 2010) has focused on a whole of program approach to their rubrics in order to provide both students and academics with standards across degree programs and into professional careers.

While the approach taken is important, Hager (2006) argued that sound university education cannot be easily reduced to a ‘tick list’ of skills or competencies, many of which

are often ill-defined, overlapping, and difficult to measure. In the context of assurance of learning, the use of assessment rubrics has extended beyond the determination of student grades to benchmarking both against standards and between universities. To this end, rubrics are commonly used as a tool for the assurance of content, process and outcomes across subjects, particularly within accredited disciplines (Tractenberg, Umans, & McCarter, 2010).

In a cautionary vein, O'Donovan, Price and Rust (2001) identified problems with the use of rubrics in assessment, namely, the potential for multiple interpretations of criteria, where different assessors may mark to their own interpretation, and the need for explicit articulation of knowledge and skills and attributes as well as the regular application of the same criteria and levels to different academic levels. They argued that a social constructivist approach of communicating the meaning of the criteria and the expected standards is crucial for effective assurance of learning data collection (O'Donovan, Price and Rust, 2001).

Academics can assist with supporting students in understanding the criteria and standards involved in their learning by engaging them with the assessment criteria (Smith, Worsfold, Davies, Fisher & McPhail, 2011). They found using discussion and application of assessment rubrics to improve students' assessment literacy significantly improves student performance.

### **Closing the loop**

Closing the loop is a term recognised as the final step in assurance of learning, but it is really the *raison d'être* for assessing student learning' (Martell, 2007a, p. 192). Students' achievements and results can be used to plan improvement efforts (AACSB, 2007, p. 60). Coates (2007), however, in his work on exploring indicators to improve the national evaluation of teaching and learning in Australian Higher Education has warned that if value is to be given to the learning outcome data to foster quality enhancement and close the loop, then it is vital to examine the measurement methodology in order to ensure the data on which

these actions are taken is valid, which again stresses the importance of collecting reliable data.

In a 2007 survey of 179 U.S. business schools, both AACSB (The Associate to Advance Collegiate Schools of Business) accredited and those seeking accreditation, many respondents reported being confused about how to go about “closing the loop” (Martell, 2007a). This confusion would explain Taylor et al.’s (2009) findings that the use of assessment data for developmental approaches has been found to be somewhat limited.

### **Methodology**

This study forms part of a larger research project involving the exploration of assurance of learning in a range of disciplines within Australian Universities. In this phase of the research, semi structured interviews were conducted with Australian Business Faculties’ Associate Deans of Teaching and Learning (ADTL or their equivalents). Business Schools were chosen because they are currently dealing with increased international accreditation opportunities with a number of accrediting bodies. The interview guide contained theoretically grounded guiding questions that explored the respondent’s assurance of learning experiences. Interviews averaged forty-five minutes, participation was voluntary and responses were treated as anonymous and results confidential.

### ***Respondent profile***

Twenty five (25) members of the forty-one Australian Business Deans Council volunteered to be interviewed, a response rate of 64%. Tables 1 and 2 indicate the numbers of those universities represented by type and location.

Table 1. Type of university.

GO8	Technical	Regional	Other	Total
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6 (24%)	4 (16%)	6 (24%)	9 (36%)	25
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Table 2. Location of university.

ACT	NSW	Victoria	QLD	SA	WA	Tasmania	Total
2 (8%)	5 (20%)	6 (24%)	7 (28%)	1 (4%)	3 (12%)	1 (4%)	25

The interviews were taped and transcribed verbatim. The transcripts were analysed using content analysis, which involves breaking down text into categories based on explicit rules of coding (Krippendorff, 2004). Volumes of data are analysed in a systematic way, to discover and describe the issues of focal importance elaborated by the interview subjects. The central difficulty with content analysis lies in the coding, as the validity and reliability of human coding is difficult to verify. Gephart (2004) recommends the use of computer-aided textual analysis as it allows for systematic, comprehensive and exhaustive analysis.

The content analysis software used for this analysis, Leximancer 2.25, aids reliability by using machine learning rather than the researcher's interpretations to generate and apply coding to the text of the interview. Two types of reliability are pertinent to content analysis: stability and reproducibility (Krippendorff 2004). Stability relies on the researcher consistently coding the text in the same way, over time. Reproducibility relies on different human coders consistently classifying the text. The use of computer-aided textual analysis allows for systematic, comprehensive and exhaustive analysis (Gephart 2004) which supported our need for stability and reproducibility. This provides an important and transparent contrast to interpretation by the researcher and so fosters analytic triangulation (Leximancer, 2005).

The data was examined first for overall patterns and proximity followed by more detailed analysis for meaningful concepts, and the co-occurrence of concepts. A map was

generated and the concepts assessed for meaning by looking at the thesaurus for each concept, and by checking the text evidence for each concept. The absence of meaningful concepts was also checked. Once a meaningful and stable map was established, it became a starting point for further interpretation.

## **Findings**

### ***Key Concepts***

The analysis identified 37 different concepts in the interview transcripts. These concepts were ranked from highest absolute count (occurrence in the text) to lowest. The sampling categories (type and location of universities) were not identified as concepts, but AACSB was a prominent concept (ranked fifth; absolute count 105) and an identifiable category with:

- 20% business schools with AACSB accreditation
- 36% business schools in the process of applying for AACSB accreditation
- 44% business schools not currently in the process of applying for AACSB

In addition to the main research questions, the authors also asked participants about their motivation for assurance of learning and the main challenges that they faced in implemented assurance of learning.

### ***Motivation***

Motivation can be categorise into two types, internal/intrinsic and external/extrinsic. The primary motivators for assurance of learning were external factors (92%) such as government agencies as key motivators (see Table 3), i.e. AoL was mainly done to attain an outcome.

Table 3. Assurance of learning motivators.

External Accreditation (AACSB/EQUIS)	Government Agencies (TEQSA/AUQA/AQF)	Professional Bodies
18 (72%)	6 (24%)	5 (20%)

Respondents also commented that assurance of learning encouraged continuous improvement of their programs, providing evidence of students' development of graduate outcomes/attributes. One respondent commented that continuous improvement of curriculum is something that academics are 'always striving for anyway' (i.e. intrinsic motivation).

### *Systematising the process*

There was much discussion about the processes put in place to map learning outcomes/graduate attributes. The responsibility within institutions for the mapping rested either with academic staff (64%), or Faculty management (36%). The level of mapping varied, 40% mapped to subject level and 60% to specific assessment tasks within a subject. Of those respondents who mapped to assessments tasks, all but one were AACSB accredited or in the applications process. Mapping tools fell into two categories: standalone excel based spreadsheet instruments; and embedded in online course management systems but differed in the level that they mapped to, that is from individual subject mapping to whole of program mapping to specific assessment tasks.

### *Evidence*

Although mapping of learning outcomes across the program was common practice, 60% of respondent institutions had not yet collected any specific learning outcome data. Ten institutions were collecting learning outcomes data and key differences existed in their approach. Of the institutions who collected data, half of these did so in a capstone subject.

Only four collected data across the whole program to obtain measures of students' achievement throughout their degree. One institution chose to use a standardised testing method.

Of those collecting data, assessment was typically marked by the academics responsible for teaching the subject (24%), and the remainder by independent markers (16%). Some institutions collected overall marks for the specific mapped assignment (12%), and others used (28%) the marks for specific criteria against a graduate attribute.

Rubrics were commonly used for evaluating learning standards (80%) and those not currently using these stated that it was their intention to develop rubrics in the future. Some 44% of institutions used a standardised approach to rubrics with the remainder allowing individual rubric development for each subject. The development of rubrics also differed with 48% developed by academic staff, 16% by educational experts, and 16% by Faculty management. One institution offered a monetary incentive for teams of academics to write rubrics for their program.

Despite acknowledged intentions to undertake the measuring of learning outcomes as a formative tool, the actual practice was generally summative. Those collecting data were aware that it was important to assure learning near the completion of degree programs in order to allow students the duration of their program to develop their skills. However, there were different opinions as to whether using an end point, for example a capstone subject, alone was sufficient, as it did not allow time for academic staff to adapt their practice if students were not achieving the expectations of the program.

Tools were being used to streamline the collection process, the most common being online marking systems which allowed individual marking and then collated the learning outcomes data in a report format and also a tool for capturing individual components within group work. The most frequently used tool was the software program ReView.

### *Challenges*

The challenges identified by the respondents in developing and measuring learning outcomes were academic staff attitudes, scale and technical issues. The majority of were attributed to extrinsic factors like compliance with engagement but some were intrinsic, for example valuing the process. In terms of concept frequency, although ‘assessment’ was ranked first in Leximancer (absolute count 266) as a way to refer to the assurance of learning practice, ‘workload’ was ranked second (absolute count 146) and ‘time burden’ was third (absolute count 135).

### *Academic staff workload*

The majority of the respondents believed academic staff considered assurance of learning to be extra work, making it difficult to get greater support for the process other than basic compliance; for example, ‘staff looked upon assurance of learning as extra burden’, and ‘time consuming, academic staff see it as imposition on their time’. Along with high teaching workloads was the sense that institutionally assurance of learning was an add-on and not valued in terms of remuneration and advancement. Participants emphasised the challenge of time for academic involvement when staff are under constant pressure for research output.

### *Academic staff engagement*

Many respondents reported difficulties in getting staff buy-in and engagement. They commented ‘the challenge is to get beyond that this is more than ticking a box, it’s about improving student learning outcomes’. They discussed coming up against: *cynicism about the usefulness of assurance processes; a limited understanding of pedagogy and education amongst academic staff; traditional approaches to teaching*, ‘the ones that are

really hung up on the content [*of subjects or programs*] are the ones that have the most difficulty accepting a different way of thinking about their course and their assessment'; *staff turnover*; and mere *compliance to the processes without real engagement*, 'we have achieved staff acceptance, not buy-in'. Overall, the participants felt that engagement was more or less a long term challenge; 'it took me six years to get staff buy-in'. While certainly solutions exist, for the most part, anxiety about assurance of learning is dispelled once the processes are in place.

### *Scale*

The size of the challenge to map learning outcomes into curricula and collect data over a number of subjects and/or programs in a faculty was seen to be daunting by numerous respondents, especially those universities with large student populations, for example, universities with intakes of over 1000 students in undergraduate programs. An example recognises the changes that may be required: 'the challenge is to lock in assessment tasks – for example, we had to reduce class sizes so that every student could do a presentation and we had to make an exam question compulsory instead of choice'.

### *Sustainability*

The main viewpoint was the necessity of engaging staff and embedding the processes in the curriculum. Attempts to minimise or isolate the work assuring learning from unit and program coordinators meant that the process needed to be driven by a few individuals. Sustainability resulted where embedding assurance strategies into normal teaching work occurred. 'We deliberately didn't go down having external people come in and mark 10 per cent of the exams and remark them. That to me is not sustainable'. Participants also described sustainability in terms of processes becoming fairly automatic, 'if we hadn't gone with this

automated process it wouldn't have been sustainable. We realised that after just doing a handful of them that you can't do it manually'. In addition, significant participation by staff in closing the loop processes, ongoing discussions about program level outcomes, and getting assurance into the culture of schools were also discussed as important elements of making the process sustainable.

## **Discussion**

A clear driving force for developing an assurance of learning process is the requirements of external accreditation bodies including AACSB and TEQSA supporting Gallagher (2008) who notes self-regulation is not a sufficient inducement for institutional effectiveness in measuring student learning outcomes. While it has prompted assurance of learning processes to be adopted in a large number of Australian Business Schools, it also has provoked a number of negative reactions.

The lack of intrinsic motivation for assurance of learning meant that the activity relied on external pressure for activation. The process is viewed by many academics as a box ticking compliance exercise designed to meet external requirements rather than a basic education principle for assuring students learning outcomes. There is a challenge in getting academic commitment to the benefits of the assurance of learning process rather than viewing any extra requirements as a burden or a compliance add-on. A change management process may be required to promote the necessary cultural and policy change. This might be achieved through a sustained change transformation, creating a vision for the organisation in the value of assuring learning, and support the empowerment of academics to help create that vision and own the implementation plan.

Two main approaches to implementing an assurance of learning process were evident in Australian Business Schools. Namely, a 'top down' approach, where the Faculty

management assumed primary role, employing experts to develop rubrics, using independent markers to generate the data and in one case, running independent standardised testing outside the subjects. And secondly, a 'bottom up' approach, enabling subject coordinators to identify specific graduate attributes to map to their subjects, encouraging academics to develop assessment rubrics and mark assessment for subject specific and generic attributes. While the top down approach encourages a meta view (Yorke & Knight, 2006), this may not encourage academics to engage with the graduate attributes and integrate them to the individual subjects (Barrie, Hughes, & Smith, 2009). The bottom up approach provides a basis for academic staff to take ownership of the process.

When assurance of learning is not aligned to assessment, students and academics struggle to see the value of the outcomes/attributes, and therefore may not engage with it from a teaching, learning or quality development perspective. This has been shown to be particularly evident with independent testing which does not encourage the embedding of graduate attributes into the curriculum (Taylor et al., 2009). Encouraging a mix of top-down and bottom up approaches may provide the stepping stones for building a sustainable process.

Our research provided some insights on the development and use of three major elements of curriculum mapping (Britton et al., 2008; Harden & Hart, 2002; Uchiyama & Radin, 2009), namely the tool, the process and the purpose. We found the majority of institutions have a formal tool to collect the data and assist in the interpretation and analysis of the data. To refer to Coates (2007) for the need for sound measurement methodology and valid data, the crucial function of any tool is its ability to allow for detailed mapping or data collection, meaning curriculum mapping tools must be able to identify actual assessment where learning outcomes can be measured, and data collection tools must be able to mine data that are specific to the learning outcomes and not holistic marks.

The second element, the *process*, can be related to how the tools are being implemented. While the tools are a useful mechanism in opening up the curriculum mapping process to both academics and students and some are used in an interactive manner engaging academics in the process to encourage value and ownership. Data collection is one area that is less developed in many Business Schools. Many do not map to actual assessment tasks and collect overall marks for assignments rather than the specific marks associated with specific criteria for graduate attributes. Martell (2007b) suggests that this generalisation of results will not provide an accurate picture of individual student performance. The alignment of the mapping to the actual data is an important consideration as there can often be a gap between what is intended in a curriculum and what is actually enacted, resulting in an even bigger gap in the student experience (Porter, 2004). Bath, Smith, Stein and Swann (2007) advise it is important to align the curriculum with the needs of all stakeholders through planning, discussion and reviewing so that the intended and experienced program is a living curriculum. Data collections also need to be undertaken with appropriate checking mechanisms for full alignment between the map and the actual experience. This requires sampling of tasks and student work.

The *purpose* for which curriculum mapping of learning outcomes is adopted is important and, as discussed earlier, the perceived motivation for assurance of learning can impact on academic staff engagement with the process. It also impacts on the timing of the data collection. We found half of those institutions engaged in the assurance of learning process and collecting or considering data collection are using capstone subjects for the collection process. Some accrediting bodies require at least one data collection at the end of the program (AACSB, 2007). Capstones subjects in higher education usually occur in the final year of a degree and are the culmination of a student's studies, designed to integrate previously acquired knowledge, skills and experiential learning, rather than to teach new

knowledge and skills (Van Acker, Bailey, Wilson and French, under review). Capstone can provide a vehicle to collect data on student learning outcomes. However, the learning outcomes may not develop as envisaged if academics and students are unable to measure achievements and analyse them earlier against curriculum maps of where specific concepts are being taught and accessed (Oliver, 2010). A progressive approach is therefore required where graduate qualities are mapped throughout the program showing introductory, developmental and then graduate levels, providing ongoing feedback to both academics and students throughout the whole of degree.

### **Limitations and future research**

The authors accept the limitations of this initial pilot study on assurance of learning being limited by the sample population and therefore provide it as a snapshot overview of the sector. The project also proposes to run a series of focus groups to further explore the issues identified here with institutions identified as demonstrating programs fit for purpose in assurance of learning. Also an audit will be conducted with other discipline groups beyond business schools, again with follow-up focus groups and representative stakeholders from academe, and professional and industry associations. One of the significant outcomes of this project will be the development of an online resource kit to support educators with effective practice in mapping learning outcomes and collecting assurance of learning data ([assuringlearning.com](http://assuringlearning.com)).

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