

## **Congruence in teaching**

### **Enhancing congruity on the masters course Sensory Biology**

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#### **Introduction**

The dramatic expansion of student enrolments in higher education that has typified the 21st century has demanded a dramatic shift in teaching practices from elite to mass forms of education. This shift towards ‘mass higher education’ has required a transformation of the conceptual framework surrounding a given course setting – or teaching-learning environment (TLE) – to include not just the organization and provision of teaching, but a much broader set of dimensions. In accordance, Biggs (1996) introduced the concept of ‘constructive alignment’ in which intended learning outcomes (ILO) must be aligned with appropriate teaching activities and assessment tasks for a given course setting to work optimally. Building on this model, a study by D. Hounsell and Hounsell (2007) introduced the concept of ‘congruence’, which sought to capture an even wider array of direct and indirect, intentional and unintended contextual influences that may affect the TLE (Fig. 16.1). It has thus emerged, that multiple levels of congruence need to be considered when seeking to design and achieve high-quality learning outcomes if we are to meet the contemporary needs of mass higher education.

In this work, I will critically analyze and discuss elements that may improve congruence within the TLE of the masters course Sensory Biology, with the aim of highlighting actionable initiatives that could enhance the student-learning experience. Specifically, the analysis will be focused on selected dimensions of congruence, i.e. the constructive alignment of as-

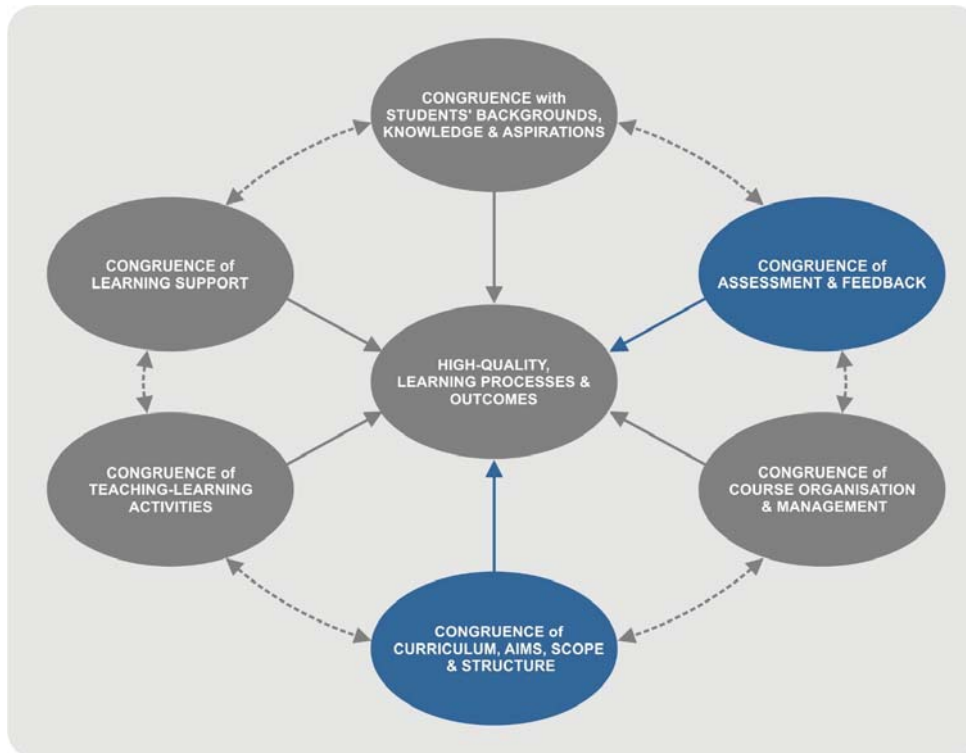


Fig. 16.1: Various forms of congruence within TLE. Levels of congruence identified for analysis and discussion in this work are highlighted in blue. Modified from: D. Hounsell and Hounsell (2007).

assessment and feedback on the course (Biggs, 1996) (see Fig. 16.1), and will primarily be based on both formal and informal student evaluations, in addition to my own personal observations. The formal student feedback originates from the electronic course evaluation conducted automatically at the University of Copenhagen, while oral feedback given in private and/or in plenum (both during and at the end of the course) has been documented in notes. Quotes from both sources will be highlighted and discussed throughout this work.

## Overview of the course Sensory Biology

The course Sensory Biology is part of the MSc program in Biology at University of Copenhagen. The course deals with animal senses – addressing all levels of biological organization, ranging from receptor molecules to animal behavior for a broad range of sensory modalities – and aims to provide

the student with a broad, comparative overview to the field. The course further aims to provide basic insights into experimental design with a focus on providing hands-on experience with some of the basic techniques in experimental neurobiology. The course typically attracts 20-25 students, of which 5-8 students come from various nationalities (with inherently different study cultures), and consists of lectures, tutorials, colloquia and practical exercises. Each of the four different practical exercises is concluded with a written report, the approval of which is a prerequisite of attending the exam. So is general and active participation, including presentation and discussion of original literature with the other students, required for completion of the course. Moreover, the students generally have very different academic backgrounds, which creates significant challenges for the design and provision of teaching. The course is taught entirely in English, the student workload is 7.5 ECTS, and the course is assessed by an oral examination (without preparation time) counting 100% of the final grade.

I am one in five different lecturers on the course, and I give both lectures and teach 2 out of four practical exercises (including correction of reports) in addition to censoring/examining during the final assessment. Moreover, there multiple guest lecturers presenting state-of-the-art within selected themes. As such, the course has a complex structure consisting of many different modes of teaching, taught by many different lecturers with implicit challenges in creating a coherent TLE.

### **Congruence between ILOs, TLAs, assessment tasks and feedback - which aspects of current practice may be improved?**

In order to identify aspects of the current teaching practices that may be improved for next year, I analyzed the formal and informal student evaluations, in addition to my own personal observations and notes from this year's course (Fig. 16.2). This analysis highlighted specific elements that should be prioritized for improvement for coming year's course, which I will discuss below:

#### **Do the student see the assessment as adequately addressing ILOs?**

The ILOs for the course is highlighted in Box 1. The ILOs have a SOLO level of 2-4 according to the SOLO taxonomy (Biggs & Collis, 1982;

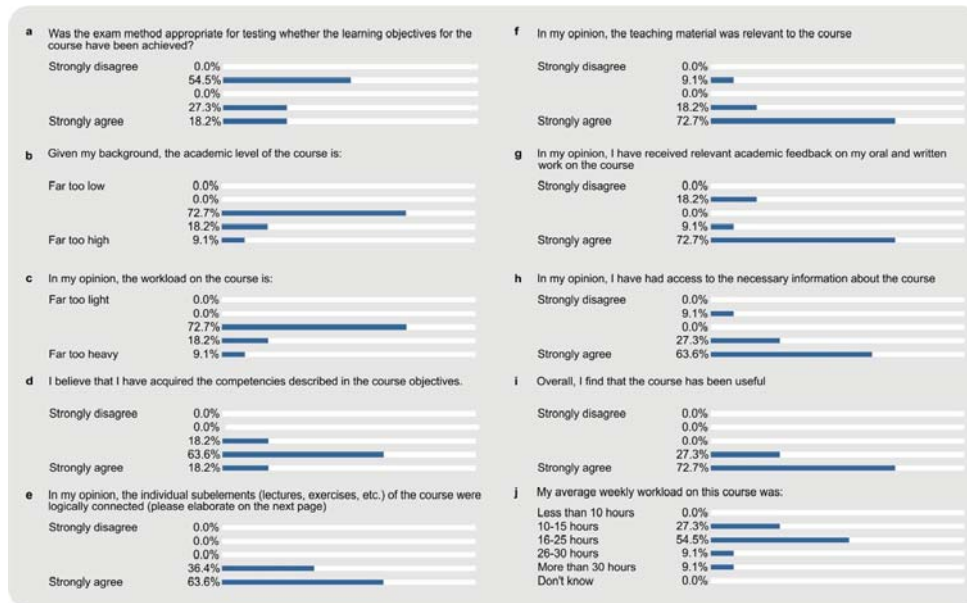


Fig. 16.2: Student evaluations of the course Sensory Biology. A total of 23 could answer the evaluation schema, 11 answered the evaluation schema, resulting in an answer percentage of 48%.

Brabrand & Dahl, 2009), and they are largely made operational via tutorials, colloquia and practical exercises. The students are generally satisfied with the course (Fig. 16.2). However, when considering the selected assessment task (oral examination without preparation time counting 100% of the grade), it is questionable whether the selected method is optimally aligned with the ILOs. Is an ‘on-the-spot’ oral examination a fair representation of the student’ performance during the course? Is this assessment task a reflection of what we want the students to learn? According to the student evaluations, the answer is no! More than 50% of the students who answered the course evaluation replied that this was an inadequate method to assess if they had achieved the ILOs of the course or not (Fig. 16.2a). Indeed, the experimental design aspect (ILO nr. 4) of the course is not assessed using this method. One student made this comment to me after the course “*I really liked the course, but I felt the exam was a little unfair. You only got to talk about a very small part of the curriculum, and because you are so stressed during the exam, you easily forget what you know*”. As stated above, the course requires a significant active participation in teaching – most notably the four different experimental practicals and associated reports – to be able to pass the course, yet none of these activities are evaluated in the award of the final grade. Consequently, a student who has performed ‘outstanding’

throughout the course could in principle still receive a low grade if the student performs badly at the oral exam. Conversely, a student who has lacked commitment throughout the course could still end up with a good grade if they are examined in the one chapter they have cared to read. It is well documented that the choice of assessment task greatly influences what and how students learn; essentially, students learn what they think they will be tested on i.e. the backwash effect (Elton, 1987). As such, a misalignment between the ILOs and the choice of assessment task may unintentionally encourage a surface approach to learning, resulting in the students never meeting the ILOs of the course. Clearly, the current assessment task could be better aligned with the ILOs if the course. Specifically, converting the assessment to a so-called portfolio exam, in which the student's performance during the different TLAs are included in the final grade, represents an attractive alternative. Practical exercises and reports: 40%; dissemination and discussion of original literature: 20%; oral examination: 40%. This would achieve a much better alignment between ILOs, TLAs and the assessment tasks on the course, and would help guide the students towards deep learning approaches throughout the various course activities.

### **Do the students receive relevant and sufficient feedback on their work?**

Although most of the students agreed that they had received relevant academic feedback on their written and oral presentations (Fig. 16.2g), several students mentioned in their course evaluation that they had not received sufficient feedback on their reports. One student simply stated "*Better feedback on the reports*", while another student wrote, "*It was unclear whether the reports were automatically approved when we handed them in or if we were expected to correct them and resubmit*". In line with this critique, and to work towards converting the assessment task into a portfolio exam, the reports on the practical exercises could be changed into a feed-forward assignment with the format "draft - comment - revise - resubmit". Although this would invariably take up more time spent on this TLA for the teachers, it would also promote the students to become much more engaged in the report writing. Indeed, this approach would take advantage of 'student backwash' to help achieve the ILOs of the course, because when the students know they have to respond to the formative feedback given, and that the report ultimately counts towards their final assessment, they will approach the task in a very different way! However, as previously stated, implementing

this change could potentially become very time consuming for the teachers on the course, and so it would become very important to evaluate on the benefits of this approach. Would this actually improve on student learning measurably, or could our time be spent better?

**Box 1. Intended learning outcomes (ILOs) for the Sensory Biology course.**

1. Interpret the connection between animal behavior/communication and the underlying sensory biology
2. Determine the modality of a sensory organ based on its structure
3. Evaluate and compare the quality of the sensory input across sensory modalities and animal groups
4. Design and set up experiments (including electrophysiology) on the quality and functionality of the sensory input from a range of sensory organs

## Summary and conclusions

Analysis of student feedback and personal observations of selected elements of congruence within the course has revealed some points relating to the assessment tasks and feedback that may be better aligned with the ILOs in the future. In particular, student evaluations suggest that changing the current assessment task from an oral examination into e.g. a portfolio exam, which better assesses all the ILOs of the course, would ensure much better alignment between the ILOs, TLAs and the assessment on the course. Furthermore, changing the report writing on practical exercises into feed-forward assignments, in which the students get to work with the feedback provided, would help promote deep learning approaches, as well as support a transformation of the current assessment task. In general, this type of analysis underlines the importance of performing a continuous evaluation and revision of a given course setting in order to ensure optimal provision of teaching and student learning, which supports mass higher education.

## References

Biggs, J. (1996). Enhancing teaching through constructive alignment. *Higher education*, 32(3), 347–364.

- Biggs, J. & Collis, K. F. (1982). *Evaluating the quality of learning: the SOLO taxonomy, structure of the observed learning outcome*. London: Academic Press.
- Brabrand, C. & Dahl, B. (2009). Using the solo taxonomy to analyze competence progression of university science curricula. *Higher Education*, 58(4), 531–549.
- Elton, L. R. B. (1987). *Teaching in higher education: appraisal and training*. Kogan Page, Limited.
- Hounsell, D. & Hounsell, J. (2007). 7 teachinglearning environments in contemporary mass higher education. In *Bjep monograph series ii, number 4-student learning and university teaching* (Vol. 91, 111, pp. 91–111). British Psychological Society.