

## **Constructive alignment in “Human Parasitology” with emphasis on the final assessment**

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### **Problem formulation**

Is the course in “Human Parasitology” constructively aligned and how is the relationship between learning objectives (ILOs), teaching activities (TLAs) and the final assessment which has been described for the course?

### **Introduction**

The course “Human Parasitology” (7,5 ECTS), is a part of the “MSc Programme in Parasitology”. The description of the course is enclosed as Appendix A. The course “Human Parasitology” is a new addition to the master programme and took place for the first time from November 2009 to January 2010. It is therefore not part of the course description for the “MSc Programme in Parasitology” (studieordningen 2008/2009) but it can be assumed that the description, including the learning objectives (Appendix A) will be transferred to the course description for the “Master in Parasitology” in 2010.

The aim of the current project was, with specific emphasis on knowledge, skills and competences mentioned in the learning objectives, to determine how these are aligned with course content, teaching methods and assessment in the final examination.

## Background

When we talk about alignment of course, we understand it as the linking or coherence between the Intended Learning Outcomes (ILOs) of the course, the Teaching and Learning Activities (TLAs) and the Assessment Tasks (ATs). Constructive alignment is constructive because it is based on the constructivist theory, implying that learners use their own activities to construct their knowledge or teaching outcome. Constructive alignment is obtained when the ILOs, TLAs and ATs are linked with the aim of achieving deep learning as opposed to superficial learning (Biggs and Tang; 2007, chapter 4). Furthermore, constructively aligned teaching is likely to be more effective since there is a maximum consistency throughout the system. In the following I have analyzed the course in “Human Parasitology” from a constructive alignment perspective.

## Methods

After scrutinizing the course description (Appendix A) and the time schedule for the course, I decided to base my data collection on in-depth interviews with one of the course organizers and two of the teachers in the course. The interviews were open-ended with few specific questions. I asked about the knowledge, skills and competences they viewed as being most important for the students to obtain, the teaching methods they used and the methods in general. I asked how they saw the TLAs in relation to afore mentioned competences. I then asked their opinion about the final assessment (a multiple choice test without books). Finally, I asked about how the organizer/teachers perceived the students’ learning and participation in the course. I am also teaching in the course myself (my teaching takes place 3 days in January 2010 just before the course ends with an examination) and I had formed my own opinion about the learning objectives in relation to teaching activities and especially final assessment.

Since I did not want to influence the answers I could get from my interview persons, I refrained from using the written questionnaire where questions either have to be very specific in order to allow people to give short answers, or it has to be open-ended questions where people can provide long answers. With the former there is a risk of creating a bias through the specific phrasing of questions and with the latter there will be a risk of

getting few answers because most teachers are very busy and may feel it overwhelming to write long stories.

I also had a chance to talk to the students and perform an informal focus group discussion, where I asked about their views concerning the course content, the teaching methods and their expectations in relation to their outcome of the course.

## Results

The current course has 9 students. Four of the students are taking the course as part of the MSc in Parasitology. There are 5 Danish and 4 students from outside Denmark on the course. The language used throughout the course (teaching, written assignments, textbooks, papers and final assessment) is English.

It soon became clear from talking to the course coordinator and the teachers that one of the main things which occupied the minds of the students was the final examination. *“Is this [specific topic mentioned] something we need to know for the exam?”* The teachers had all experienced that this or similar questions were frequently asked at the beginning of lectures or sometimes when a teaching activity engaging the students in active participation was applied, such as group work in relation to articles dealing with broader and cross cutting topics e.g. how to integrate control of various parasite infections. The students were active and had prepared their presentations for the following lecture, but they were very anxious about having to read papers which were not part of the curriculum and maybe spending time on topics which were not directly relevant in relation to the examination.

On the other hand, students liked the fact that the teachers involved in the course were different experts each with their own field of expertise and the fact that they therefore almost always had lectures given by the top experts with a profound knowledge of and engagement in a particular topic. *“This is a luxury..we feel privileged”, “The teachers are very engaged in their topics”*.

I will therefore briefly in the following mention the results concerning the ILOs and the teaching activities, but I have chosen to concentrate on the final assessment in my project. There were several reasons for this: The final assessment was not aligned with the ILOs and the teaching activities; this was mentioned as a problem by both teachers and course organizer.

Furthermore, the final assessment occupied a large space in the minds of the students and this will no doubt affect the way they learn and what they learn as discussed later. Lastly, I had a chance to change the final assessment as part of my KNUD project and implement the changes immediately.

### **Intended Learning Outcome (ILO)**

The ILOs for “Human Parasitology” have been divided into knowledge, skills and competences. Under knowledge there is an emphasis on knowledge about the most important groups of human parasites, their transmission, epidemiology and control. This section reflects the multistructural SOLO level (Biggs and Tang; 2007, chapter 5) with words like “define” and “describe” but it also contains a few higher level words like “reflect”.

The section skills relates entirely to the relational SOLO level with words like “analyse”. There is for example an emphasis on the students’ ability to analyse transmission and risk factors in relation to human parasite infections and the students should be able to evaluate studies on human parasite infections.

The teachers found it important to teach some basic knowledge, but the most important learning outcome was to get the students to a point where they could analyse factors in relation to parasite transmission and infection and integrate their knowledge into a broader context in relation to human health. This corresponds to a high level in the SOLO taxonomy.

The ILOs corresponded reasonably well with the teachers’ perception of what they considered to be important learning outcomes for a course in Human Parasitology. The students were maybe less specific in their statements about their perceived outcome of the course. “*We should know about the most important human parasites, their life cycles and what they do to humans and then we should also be able to figure out what to do about them [the parasites] like control*”.

### **Teaching and Learning Activities (TLA)**

The teaching takes place as lectures and colloquia. Three visits to laboratories or institutions working with parasites, ekto-parasites or vectors have been included and two of these institutions are located outside the university area.

The teachers and coordinator were satisfied with the TLAs; the low number of students allowed teachers to be flexible regarding the teaching

activities. Microscopes had been installed in the teaching room most frequently used during the course, and lectures could thus be interrupted by short sessions where students could look at parasite specimens, histology sections or similar material. This was appreciated by both teachers and students. Furthermore, there was a possibility for demonstrating live parasite material and parasitological methods in the nearby laboratory placed in the same building.

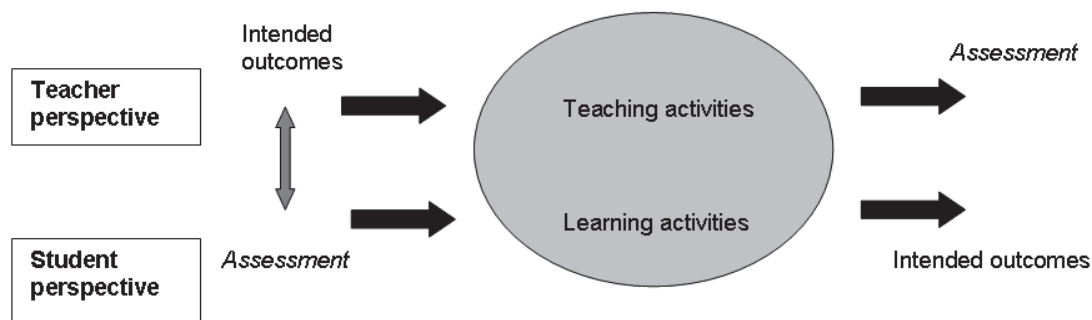
There was a general agreement that the choice of different teaching and learning activities such as lectures, colloquia, laboratory exercises, excursions and group work allowed for a constructive alignment between ILOs and TLAs. This is also my own impression.

### **Final assessment**

As mentioned previously in this section this is where both teachers and course organiser identified a problem. As previously mentioned the assessment task mentioned in the course description was a Multiple Choice Test (MCT). The teachers felt that this method of assessment had severe limitations in what kind of questions they could ask and how relevant the assessment would be in relation to the teaching activities during the course. The MCT would not give any indications about the students’ abilities to analyse problems in relation to human parasite infections in a broader context in relation to human health. This was something the students had done in class through group work and by reading and presenting scientific papers and something which was considered an important outcome of the course. *“They can always look in a parasitology text book for specific names of parasite stages and such; we should teach them to think about parasitology in relation to human health for example in Africa”.*

### **Discussion**

What students learn and how they learn it depends to a major extent on their perceptions of the examination or assessment (Biggs and Tang; 2007, chapter 9). It is therefore important through the ILOs and TLAs to convey the right message to the students about what they should be learning and how they should learn it (Biggs and Tang; 2007, chapter 9). What is equally important is to ensure that the assessment of the students comprise an authentic representation of the course ILOs and is constructively aligned with the these and the TLAs.



**Fig. 11.1.** Teacher's and student's perspectives on assessment (Biggs and Tang; 2007, p. 169)

Figure 11.1 illustrates the teacher's and student's perspective on assessment. From this figure it is clear that from a teacher's perspective the assessment is something at the end of the teaching-learning sequence of events, whereas for the students it is the starting point. Since students have such a marked focus on the assessment and since this focus to a very large extent guides their strategies for learning, it follows directly that if the intended learning outcome is reflected in the assessment then the teacher's teaching activities and the students' learning activities will be directed towards the same goal (Figure 11.1). That means that while students prepare for their examination they will actually learn the intended outcomes.

If we look at the assessment for the "Human Parasitology" course it is not constructively aligned with the ILOs and TLAs. The MCT is good at testing declarative knowledge, but not well suited for functional knowledge which there has been a major emphasis on during the course. Furthermore, it encourages surface learning and does not reward e.g. a deeper understanding of human parasitology in relation to human health. This is reflected in the fact that the students are reluctant to spend time on discussing papers which are not directly part of the curriculum, but which may improve the deeper understanding of a topic. The final assessment thus has a negative "backwash" effect (Biggs and Tang (2007, p. 169), and Cheng (2000)).

Half of the students on the course are not Danish; they are from Asia, Africa and other countries in Europe and this can also be expected to be the case in future courses. It was therefore important to find a final assessment method which took this aspect into consideration. According to Ryan

(2000, chapter 4) international students can be seriously disadvantaged by exams; partly due to language difficulties in relation to understanding and reading English and partly due to cultural factors related to different ways of teaching and learning and thus different expectations in relation to what they are supposed to know to pass an exam (Carroll and Ryan; 2008, p. 99). For example Chinese students may be disadvantaged by multiple-choice questions (Ryan; 2000, p. 49).

## **Change of the final assessment**

With all the above mentioned information and considerations in mind I decided to try to change the final assessment to ensure a constructive alignment with the course ILOs and the TLAs in order to turn the “backwash” effect into a positive force, encouraging deep learning and improvement of learning outcome.

Since the interviews demonstrated that neither the teachers nor the course organizer were happy with the current multiple choice written examination, I discussed the possibilities of changing the assessment for the current course with the course coordinator. She was clearly in favour of this and she has been instrumental in communicating the changes to teachers, students and relevant university units.

The aim has been to try to develop an assessment method which:

- Is aligned with the ILOs and TLAs
- Encourages deep rather than surface learning
- Assess the higher levels of the SOLO taxonomy
- Takes into consideration that not all students master English equally well and may need longer time to read a paper in order to comprehend the content and be able to analyse the content in relation to other topics they have learned about during the course
- Encourages active student participation in the TLAs
- Provides the students with a motivation for reading and discussing papers which are not directly part of the curriculum and for active participation in discussions and group work
- Provides an opportunity to ask questions which are of increasing complexity; from simple questions directly related to the paper to questions giving the student an opportunity to reflect on broader cross cutting issues and brilliant students an opportunity to demonstrate their knowledge and understanding

- Takes into consideration that international students should not be disadvantaged (time to read the paper in advance, short answer questions rather than a long essay, a non-Eurocentric example (the paper))

This resulted in the following suggestion for final assessment.

### **Examination in “Human Parasitology”**

The examination is a two hour written examination without aids.

After the module on repetition (Tuesday 26.1.10), the course participants will receive a scientific paper. The students will have a couple of days to read this paper thoroughly before the examination (Friday 29.1.10).

The students are not allowed to bring their copy of the paper to the examination room, but on the examination day they will receive a new copy of the paper. On the examination day the students will also receive a number of questions related to the content of the paper, which they are supposed to answer and discuss.

The paper reports original research and deals with one or more of the parasitic infections covered in the module. The questions asked will be within the curriculum of the course. Thus, there will be no questions in aspects of the paper, which are not dealt with in the course “Human Parasitology”, such as the choice of statistical tests, genetics, methods of mapping and the like.

The questions will be related to:

- Basic epidemiological aspects (who is investigated? when was the study performed? where was the study implemented? why is the study interesting? how was the study designed and implemented?)
- Aspects of the epidemiology, diagnosis, morbidity, treatment and control of the infection(s) researched in the paper
- Possible comparative aspects with other known parasitic infections described in the course

### **Afterthoughts**

My own teaching took place after we had changed the final assessment and the students had been informed about the structure of this revised exam. When I was teaching using different TLAs such as lectures, reading of scientific papers in relation to the topic where students had to answer questions



at home and discuss them in class, and practical demonstrations and microscopy, I never once got the question: “*Is this relevant for the exam?*” My pedagogical supervisor noted that the students were more active in class, discussed more and seemed less occupied with relevance in relation to exam.

One has to be very careful in interpreting this as a result of changing the final assessment because many other factors could play a role e.g. students may be more confident towards the end of a course and discuss more freely. What I describe here is merely a personal observation; I have not investigated other issues. Furthermore, since it is my own teaching I have been observing it is a very personal and subjective observation, even though it is shared by my supervisor. However it has clearly made me consider how important the final assessment may be in relation to what and how students learn.

## **Conclusion**

When assessment is aligned to what the students are supposed to be learning, then backwash can work positively and encourage appropriate learning. The final assessment for the course in “Human Parasitology” has now been changed and aligned with the ILOs and TLAs. It will be implemented for the first time at the end of January and based on the experiences with this we may further adjust the exam to ensure optimal constructive alignment and take advantage of the positive backwash effect it may have regarding the learning outcome of the parasitology students.

# A Appendix

- Define principles of disease impact estimation of parasites in man.
- Define geographical variable impact of diseases and risk factors.
- Be capable of evaluating studies on human parasitic diseases.
- Reflect about how malnourishment is a major factor for human parasitic diseases.
- Describe the basic principles of disease prevention.
- Reflect about that disease control may have complications that are not necessarily related to cost but moreover to local cultural, religious or dietary habits.

## Skills:

- Analyse cost-benefit relations in disease control in less favoured regions of the world.
- Integrate knowledge on transmission and risk factors in writing as well as by oral presentation.
- Perform overall analysis of transmission and risk factors.

## Competences:

- Collaborate with fellow students during group work.
- Appreciate the advantage of interdisciplinary work within the area of human parasite control.
- Put the obtained knowledge into perspective and discuss ethical considerations.

## Course Literature

Foundations of Parasitology; L. S. Roberts and J. Janovy, 8<sup>th</sup> edition, 2008.

## Course Responsible

(Main responsible)  
Annette Olsen, [aol@life.ku.dk](mailto:aol@life.ku.dk), Department of Veterinary Disease Biology/ DBL - Centre for Health Research and Development phone: 3 533 1403

Maria Yang Johansen, [mvi@life.ku.dk](mailto:mvi@life.ku.dk), Department of Veterinary Disease Biology/ DBL - Centre for Health Research and Development phone: 3533 1438

Thor G. Theander, [theander@cmm.dk](mailto:theander@cmm.dk), Centre for Medical Parasitology, Immunology and Microbiology, Institute for International Health, phone: 3532 7675

## Study Board

Study Committee NSN

Course Scope	
Lectures	40
Exercises (Colloquia and laboratory based)	50
Excursions	8
Group work	34
Preparation	60
Supervision	12
Examination	2
	206

## Human Parasitology

Department of Veterinary Pathobiology 80 %  
Centre for Medical Parasitology, Institute for International Health 20%

**Earliest Possible Year** MSc. 1 year

**Duration** One block

**Credits** 7.5 (ECTS)

**Course Level** MSc

**Examination** Final Examination

Written examination

No aid allowed

Written examination will be computer based multiple choice

Weight: 100% written examination

7-point scale, internal examiner

None

**Requirement for Attending Exam Organisation of Teaching**  
The teaching takes place as lectures and colloquia. Three visits to laboratories or institutions working with parasites are included. Two of these institutions are located outside the University area.

**Block Placement** Block 2

**Teaching Language** English

**Recommended prerequisites**

**Restrictions** Max. 30 students

**Course contents**

The course contains an introduction to the occurrence and importance of human parasitic diseases.

The aim of the course is to educate in human parasites including protozoans, helminths and ectoparasites. The vectors of parasites (snails and arthropods) will also be included. The course is a prerequisite for other compulsory courses under the Master of Science in Parasitology.

## Learning Outcome

It is the aim of the course to provide the student with an introduction to the occurrence and importance of human parasitic diseases

## Knowledge:

- Describe the most important groups of human parasites and the general structure of their transmission, epidemiology and control.

All contributions to this volume can be found at:

[http://www.ind.ku.dk/publikationer/up\\_projekter/2009-2-1/](http://www.ind.ku.dk/publikationer/up_projekter/2009-2-1/)

The bibliography can be found at:

[http://www.ind.ku.dk/publikationer/up\\_projekter/kapitler/2009\\_vol2\\_nr1\\_bibliography.pdf/](http://www.ind.ku.dk/publikationer/up_projekter/kapitler/2009_vol2_nr1_bibliography.pdf/)