

1 Abstract

2 Teaching of Psychology includes a great variety of topics, course formats and assessment  
3 approaches. A central concept that incorporated the interface between teaching goals,  
4 instructional methods and examination modalities is referred to as Constructive  
5 Alignment (CA). Initially developed by Biggs (1996), this model addresses possible  
6 designs of teaching to improve students' learning outcomes as well as enhance their  
7 learning experiences and claims to be applicable independent of disciplinary culture or  
8 content. Despite the importance of this approach from an instructional point of view,  
9 there is hardly any research that concerns to capture the three dimensions of Constructive  
10 Alignment so far. As a consequence the aim of our study was to create an instrument to  
11 assess the quality of CA within psychology classes. A questionnaire was designed and  
12 was additionally analyzed with regard to students' judgements about overall course  
13 evaluation. The questionnaire was employed in two lectures within the field of  
14 educational psychology for teacher training students. Results reveal that overall course  
15 evaluation can be predicted by the match between course objectives and instructional  
16 methods while other course evaluation factors failed as predictors. With a high internal  
17 consistency, the instrument provides a supplement for traditional course evaluation  
18 instruments.  
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1  
2 Submission Type: Article  
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4 Introduction

5 Research on academic teaching in higher education has become more and more important.  
6 Universities and other academic institutions have developed awareness that teaching is a central  
7 component of academia (Wang, Su, Cheung, Wong & Kwong, 2013). Thus, the quality of  
8 academic teaching has become a competitive factor in higher education and universities  
9 worldwide are implementing specific quality enhancement frameworks based on teaching,  
10 learning and evaluation strategies to improve students learning outcomes (Hénard & Roseveare,  
11 2012). During the last years Biggs' model of Constructive Alignment (1996) has become a  
12 quality feature in higher education. In the Constructive Alignment approach, the first step is to  
13 plan the desired learning outcomes. This is followed by the alignment of teaching and its  
14 assessment. Constructive Alignment is a well-known concept among teachers (especially  
15 secondary school teachers). Yet, little is known about how university students perceive whether a  
16 course is designed after the principles of CA or not. In addition, it remains unclear how course  
17 design according to CA has implications for student evaluation of teaching (SET).  
18 The importance of SET has continuously increased during the past decades is an indicator for  
19 quality improvement in higher education (McKimm, 2009; Zabaleta, 2007).  
20 Nevertheless, an instrument for evaluating of the alignment between intended learning outcomes  
21 (ILO), teaching methods and assessment tasks is still missing. Such an instrument could be able  
22 to enrich common SET. In this research, we developed an additional evaluation tool that aims on  
23 capturing students' views on the construct of CA. Based on Biggs model of "Constructive  
24 Alignment" (1996), we suggest here a questionnaire that is able to capture the perspective of  
25 students' rating of the fit between intended learning outcomes, teaching methods and assessment  
26 tasks. This synchronization is usually a core element of the Instructional Design process when  
27 planning, conducting, and evaluating a learning environment.

28  
29 Course Planning and the Instructional Design Process

30 In general, course planning and teaching are no intuitive processes but should rather be based on  
31 scientific rules and theories of psychology or related domains (Sweller, Ayres & Kalyuga, 2011;  
32 Zumbach, 2010). As course planning is dependent on various factors, a careful planning, analysis,  
33 design and evaluation is indispensable (Zumbach & Astleitner, 2016). This design of learning  
34 environments according to professional criteria is generally defined as *Instructional Design* (ID).

1 Key elements of the Instructional Design process include, for example, needs assessment,  
2 analysis of learning, assessment of learner characteristics, choice of learning content, choice of  
3 didactical approach, design and use of instructional media and design of learning assessment  
4 procedure (Schott, 1991; van Merriënboer & Kirschner, 2013).

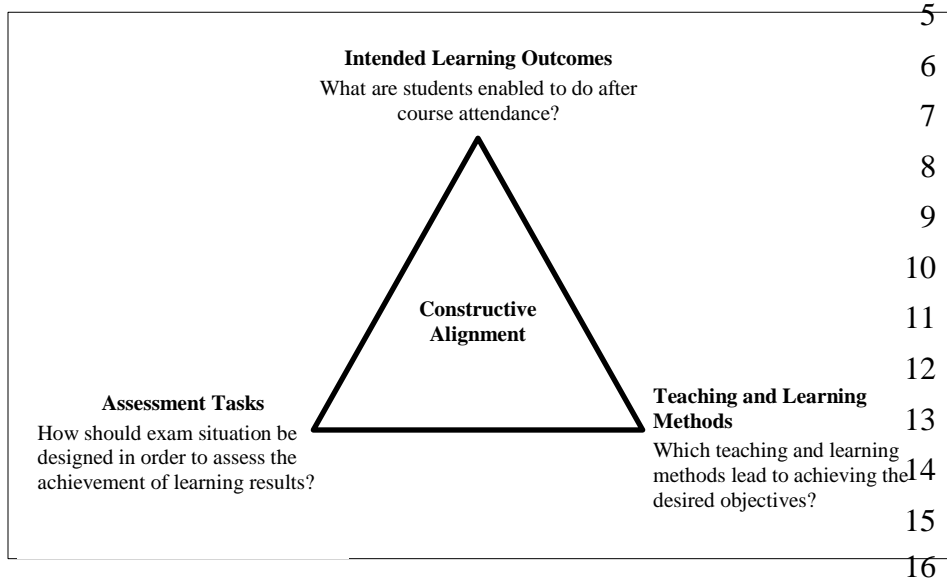
5 In addition to the process of planning and design a learning environment, a continuous evaluation  
6 of the whole procedure and its subsequent steps is crucial. Most commonly, different methods of  
7 formative and summative evaluation are applied here in order to optimize single elements of the  
8 learning environments or the whole instructional product itself (Man Sze Lau, 2016, Schott, 1991;  
9 Zumbach & Astleitner, 2016). *Constructive Alignment* (CA) could serve here as helpful approach  
10 to synchronize these different parts during the process of planning and implementation of  
11 learning environments (Biggs, 1998; Man Sze Lau, 2016). CA starts with the learning outcomes  
12 that are students intended to achieve at the end of the course. Intend learning outcomes (ILO)  
13 should precisely describe what students will be able to do or know at the end of the semester/a  
14 course. ILOs are usually based on a learning taxonomy (e.g., the one provided by Anderson &  
15 Krathwohl, 2001) and should be published and explained to students at the beginning of a course  
16 or at the beginning of each unit (e.g., within the syllabus). According to the ILOs, teaching and  
17 assessment methods are aligned. Evaluating the synchronization among ILOs, teaching- and  
18 learning-related instructional approaches and assessment tasks, formative and/or summative  
19 course evaluation should improve course quality (Zumbach & Astleitner, 2016).

### 21 Constructive Alignment

22 Constructive Alignment (CA) is an approach to enhance the quality of teaching and learning  
23 (Biggs & Tang, 2007; Wang et al., 2013). CA focuses on two aspects: "... the 'constructive'  
24 aspect refers to the idea that students construct meaning through relevant learning activities. That  
25 is, meaning is not something imparted or transmitted from teacher to learner, but is something  
26 learners have to create for themselves. (...). The 'alignment' aspect refers to what the teacher  
27 does, which is to set up a learning environment that supports the learning activities appropriate to  
28 achieving the desired learning outcomes. The key is that the components in the teaching system,  
29 especially the teaching methods used and the assessment tasks are aligned to the learning  
30 activities assumed in the intended outcomes." (Biggs, 2003, p. 1) The evaluation of CA itself can  
31 also extend common SET and, thus, improve quality management in higher education. Wang et  
32 al. (2013, p.477) describe CA as a pedagogical approach that is embedded in the constructivist  
33 theory of learning, emphasising the alignment between ILOs, teaching and learning activities and  
34 assessment methods. A triangle provides a suitable illustration of that concept, as CA orients

1 itself towards the three core issues of ILO, instructional/didactical approaches, and assessment  
2 (see Figure 1). Biggs and Tang (2007) postulate that learning environments aligning these three  
3 fields will foster learning and enhance students' learning experiences.

4



17 Figure 1: Baumert & May, 2013; Biggs, 1996; translated version

18

19 When designing a course based on the idea of CA, the first step is to define the learning  
20 objectives. Decisions about teaching and assessing assessment methods in an aligned system of  
21 instruction have to follow (Biggs, 1996). This should ideally be a fully criterion-referenced  
22 system, where the objectives define what to teach, how to teach and how to assess performance.  
23 Thus, there have to be precise learning objectives and the teaching methods should support  
24 students in the best way to accomplish these objectives. This also implies that given assessments  
25 have to represent the objectives (Biggs, 2012). As indicated by the triangle, the three elements are  
26 arranged within an overall context. Thus, they are mutually dependent; hence, the aim is to  
27 optimally synchronize all factors (see also Biggs, 2014).

28

### 29 Constructive Alignment in Psychology Learning and Teaching

30 Within the field of Higher Education, many questionnaires for SET have been developed (e.g.,  
31 Diehl & Kohr, 1977; Spinath & Stehle, 2011; Staufenbiel, 2000; Rindermann, 2001).

32 Nevertheless, the link between evidence-based improvement of learning and teaching, SETs, and  
33 instructional design is often rather hidden than obvious (Braun, 2011).

1 Here, CA might be an appropriate concept to make this link visible. While CA is rather a broad  
2 concept that can be used independent from single disciplines, the need to implement this  
3 construct within psychology learning and teaching is evident. Like in other academic disciplines,  
4 content/learning objectives, teaching approaches, and assessment vary in a great range, mostly  
5 dependant on learner characteristics. Implicitly and explicitly, most course formats and their  
6 syllabi as well as curricula are based on learning taxonomies (e.g., Anderson & Krathwohl, 2001,  
7 Krathwohl, 2002). Depending on the level of the taxonomy, different course formats and  
8 conditions of the (pedagogical) environment, degrees of freedom related to instructional design  
9 can be limited. If the learning objectives remain on a basic taxonomic level (e.g., knowledge,  
10 remember, understand; Krathwohl, 2002), the number of students is rather high, lecturing might  
11 be an appropriate instructional approach. The assessment should here remain on the same  
12 taxonomic level (e.g., multiple-choice or short-essay questions on the same taxonomic level).  
13 If a focus of a course is located on a higher taxonomy (e.g., analysing, evaluating, creating), a  
14 large class and lecturing is rather inappropriate. In a course that aims on applicable problem-  
15 solving skills, these skills have to be fostered by students' active participation (e.g., by Problem-  
16 Based Learning or Skills Labs). Consequently, multiple choice exams do not or hardly reflect  
17 desired learning outcomes. Yap, Bearman, Thomas and Hay (2012) suggest here, for example, in  
18 the field of clinical psychology the use of Objective Structured Clinical Examinations (OSCE). In  
19 their pilot study they report that students regarded OSCE as a valid, realistic, and fair assessment  
20 method. Nevertheless, there also limitations of OSCE: The study by Bogo, Regehr, Katz et al.  
21 (2012) within the field of social work showed that students performing well within a practicum  
22 performed worse in a corresponding OSCE. This example shows the need of synchronisation  
23 between assessment and instructional approach and especially its evaluation in order to guarantee  
24 the validity of the assessment approach (or the validity of the instructional method).  
25 The need to align the elements of instruction refers to all fields of psychology. If we expect  
26 students to use and apply behavioural research methods, it is not sufficient to tell them about  
27 research. They have to do research in order to understand possibilities but also constraints of  
28 methodology. Subsequently, testing their knowledge within a standardized, written exam seems  
29 also to lack of face validity. Here, grading of research papers is more appropriate.

30

### 31 Constructive Alignment and Academic Course Evaluation

32 The importance of systematic academic course evaluation as a core approach to support quality  
33 management in Higher Education has improved since the early 1990s (Bialowas, 2016; Braun &  
34 Gusy, 2006). Academic course evaluation is here not regarded as a mere performance rating, but

1 rather as an instructional intervention and, thus, as a quality control instrument (Ernst, 2008).  
2 Meanwhile, a broad repertoire of formative and summative evaluation methods have been  
3 developed, ranging from open interviews to standardised questionnaires (e.g., Zumbach, Spinath,  
4 Schahn, et al., 2007).

5 From a scientific point of view, academic course evaluations are often used in order to develop  
6 models for an “ideal” model of teaching in higher education and to predict academic  
7 achievement. Schneider and Preckel (2017) investigated in their meta-analysis the correlations  
8 between 105 variables and achievement in higher education and separated two dimensions:  
9 instructional characteristics and student characteristics. In their analysis the highest correlations  
10 of effective instructional approaches with high student achievement have been the  
11 implementation of peer assessment, the provision of opportunities for meaningful learning, the  
12 clarity and understandability of instructional material, students’ self-assessment, stimulation by  
13 teacher, and stimulation of social interactions. Student characteristics correlating highly with  
14 academic performance are here (among others) students’ self-efficacy, grade goal, frequency of  
15 class attendance and intellectual prerequisites). Some of these variables are also mostly  
16 implemented in standardized course evaluation questionnaires. Results from this research show  
17 that the kind of assessment applied in courses has a major impact on the level of information  
18 processing (e.g., multiple-choice exams resulting in a rather shallow level of information  
19 processing; Atkins, 1995; Flores et al., 2014). Also the way how students perceive the quality of  
20 learning is affected by the way how exams are related to the overall course design (Brown and  
21 Knight, 1994; Drew 2001; Pereira, Flores & Niklasson, 2016). Therefore it is highly important  
22 not just to have a look at single factors influencing students learning and academic achievement.  
23 It is rather important to use instruments in course evaluation that focus on the interaction of  
24 different course characteristics, rather than looking on mono-causal relationships.

25 While the model provided by Biggs (1998) has opened a wide field for curriculum design ideas,  
26 little is known about its effectiveness on qualitative aspects of curriculum as well as on course  
27 design. Trigwell and Prosser (2013) point out that there is no empirical evidence of qualitative  
28 variation in the way academic staff considers all three dimensions for teaching and course design  
29 and how they align those elements for student learning.

30 Thus, the aim of our study was to develop an instrument that depicts students’ perspectives on the  
31 implementation of the three dimensions of CA in a course and, thus, to obtain additional  
32 information in order to improve course quality. Hence the following three research questions  
33 were addressed:

34 • Can the developed instrument reliably and valid represent the three dimensions of CA?

1 • How are the three dimensions of CA related to each other and to course evaluation in  
2 general?

3 • How are the three dimensions related to SET?

4 We assume that with some limitations, it is possible to assess students' perspective of the  
5 dimensions of CA reliably and validity. Furthermore, we expected the three dimensions to be  
6 strongly related to each other. We also expect that CA has an influence on students' perception of  
7 a courses' quality.

## 8 9 Method

10 A literature search on instruments using the concept of CA for course evaluation did not provide  
11 any result. Therefore we developed an instrument that represents all three dimensions of CA and  
12 provides the possibility to assess students' perspective of the alignment of ILOs, teaching  
13 methods, and assessment tasks. The instrument was applied as a questionnaire-based survey  
14 within the field of educational psychology within a pre-service teacher curriculum.

## 15 16 Material

17 For each dimension of CA, we developed five items. We tested a first version of our  
18 questionnaire with a small sample in a faculty of law. The internal consistency of the scales were  
19 acceptable, but still required re-formulation of some items. After adapting these items, the  
20 questionnaire had four subscales; the first three scales refer directly to assess students'  
21 perspective of the implementation of CA:

- 22 • Fit between instructional methods and ILOs (5 items, Cronbach's Alpha =.75; e.g.,  
23 „Teaching methods are adapted to content and learning objectives“)
- 24 • Fit between ILOs and assessment (5 items, Cronbach's Alpha =.75; e.g., „The assessment  
25 reflects content and ILOs“)
- 26 • Fit between assessment and instructional methods (5 items, Cronbach's Alpha =.76; e.g.,  
27 „The assessment reflects the different teaching methods“)

28  
29 A fourth scale was added in order to assess the flexibility of teachers to adapt the teaching  
30 methods accordingly to changes within ILOs during a unit. This scale was designed to assess  
31 instructor's flexibility during a course assuming that within a course different learning objectives  
32 require different instructional approaches.

- 33 • Flexibility in adjusting teaching methods (4 items, Cronbach's Alpha =.82; e.g., “The  
34 teacher used instructional methods in a flexible manner”)

1

2 In addition, a short scale assessing the overall course evaluation has been applied (15 items with  
3 four dimensions; All items (except item 15) were as 5-point Likert scales (from 1 “*does not apply*  
4 *at all*” to 5 “*fully applies*”; Zumbach et al., 2007)

- 5 • Form and structure (4 items, Cronbach’s Alpha = .76; e.g., “*The course is clearly*  
6 *structured*”),
- 7 • Teacher characteristics (4 items, Cronbach’s Alpha = .80; e.g., “*The teacher is open to any*  
8 *form of constructive critics*”),
- 9 • Scope and relevance (3 items, Cronbach’s Alpha = .44; e.g., “*The relevance of the presented*  
10 *teaching content was high (e. g., for the exam, for the future job, for the discipline)*”,
- 11 • Learning success (3 items, Cronbach’s Alpha = .76; e.g. “*I think that my performance in this*  
12 *course and my learning progress is very high*“).
- 13 • A final item assessed the overall evaluation of the course by using the Austrian grade system  
14 ranging from 1 (very good) to 5 (very poor).

15

#### 16 Data Source and implementation of the study:

17 The study was conducted at the end of the summer term in 2017. 129 students at a German  
18 speaking research university participated in this study. 96 were female and 32 were male. The  
19 mean age was 23.02 (*SD* = 4.60) and the average number of semester was 4.38 (*SD* = 2.16). All  
20 participants were enrolled in the pre-service teacher program. The ILOs were presented at the  
21 beginning of the course and were available to students during the term within the syllabus.

22 The questionnaire was given to students at the end of two introductory lectures into educational  
23 psychology and developmental psychology for teacher training students right after the written  
24 exam. Students were not graded at this time of the semester. Participation was voluntary.

25

#### 26 Results

27 *Research Question 1: Can the developed instrument reliably and valid represent the three*  
28 *dimensions of CA?*

#### 29 Fit of the instrument

30 To examine the assumed structure of the scales a Principal Component Analyses with subsequent  
31 Varimax Rotation was applied to all items. Following a Scree Plot analysis and the Kaiser-  
32 criterion (Eigenvalues > 1), four factors were extracted (sequence of original Eigenvalues: 6.18,  
33 2.31, 1.55, 1.47). These four factors explain 60.56% of overall variance (the fit between teaching  
34 methods and content: 18.85%; the fit between teaching goals and exams: 15.58%; the fit between



1 exams and methods: 13.21%; the flexibility in adjusting teaching methods: 12.92%). For all  
2 individual factor loadings see table 1.

#### 4 Course evaluation/SET

5 The descriptive data (see figure 2) show considerably moderate to high scores for almost all  
6 subscales. The students rated all three CA dimensions moderately high, with a rating between  
7 3.16 and 3.87. The highest rates were given to the *Teacher Characteristics* (4.24) as well as to the  
8 *Form and Structure* (4.09). The participants classify their *Learning Success* with a value of 3.78.  
9 *Scope and Relevance* had a mean value of 3.77. The scale *Methodology/Flexibility* was rated with  
10 on average with 3.16. The overall *Grade* was 2.74 (1 = very good; 5 = very poor). As the three  
11 dimensions of CA are aligned to each other, we computed the mean of the sum value of the three  
12 dimensions: “*Fit between instructional methods and ILO*”, “*Fit between ILO and assessment*  
13 *task*” and “*Fit between assessment task and instructional methods*”. The mean value for CA was  
14 here 3.61. All CA scales show acceptable Cronbach’s Alpha values (see table 2).

15  
16 *Research Question 2: How are the three dimensions of CA related to each other and to course*  
17 *evaluation in general?*

18 A correlation analysis was conducted in order to examine the relation between the dimensions of  
19 CA and the course evaluation. As the three dimensions of CA are aligned to each other from a  
20 theoretical point of view, we analysed 1) how they correlate with each other and 2) how they  
21 correlate with the subscales of the course evaluation. Only correlations higher than .30 are  
22 reported here (all correlations are listed in table 3).

23 There is a correlation among CA subscales “*Fit between Instructional Methods and ILO*” and “*Fit*  
24 *between ILO and Assessment*” ( $r_{(116)} = .39, p < .01$ ). The subscale “*Fit between Instructional*  
25 *Methods and ILO*” is correlated with “*Form and Structure*” ( $r_{(115)} = .49, p < .01$ ), “*Teacher*  
26 *Characteristics*” ( $r_{(114)} = .44; p < .01$ ) and “*Learning Success*” ( $r_{(115)} = .34, p < .01$ ).

27 The subscale “*Fit between ILO and Assessment*” is also correlated with the three subscales from  
28 the overall course evaluation “*Form and Structure*” ( $r_{(119)} = .31, p < .01$ ), “*Teacher*  
29 *Characteristics*” ( $r_{(117)} = .39; p < .01$ ) and “*Learning Success*” ( $r_{(119)} = .49, p < .01$ ).

30 The subscale “*Fit between Assessment and Instructional Methods*” correlates with “*Scope and*  
31 *Relevance*” ( $r_{(114)} = .45, p < .01$ ).

32 The scale “*Form and Structure*” correlates with the scales “*Teacher Characteristics*” ( $r_{(120)} = .58;$   
33  $p < .01$ ), “*Learning Success*” ( $r_{(123)} = .53, p < .01$ ) and “*Scope and Relevance*” ( $r_{(124)} = .49, p < .01$ )

1 Correlations higher .30 were also found among “*Teacher Characteristics*” and “*Learning*  
2 *Success*” ( $r_{(120)} = .47, p < .01$ ) and “*Scope and Relevance*” ( $r_{(120)} = .48, p < .01$ ).  
3 The subscale “*Learning Success*” also correlates with “*Scope and Relevance*” ( $r_{(123)} = .62, p < .01$ ).  
4 Students overall grading of the course only correlates higher than .30 with the CA subscale “*Fit*  
5 *between ILO and Assessment*” ( $r_{(115)} = .34, p < .01$ ).

### 6 7 *Research Question 3: How are the three dimensions related to SET?*

8 In order to analyse to which extent students’ perspective of CA and factors of SET contribute to  
9 the overall grade given by students at the end of the semester for the course, a regression analysis  
10 was conducted. Independent variables were all subscales mentioned before. The dependent  
11 variable was the overall grade.

12 A stepwise regression model revealed a variance explanation of 15% ( $R^2 = .15, F_{(1,108)} = 18.35, p$   
13  $< .001$ ) by the predictors *Fit between Instructional Methods and ILO* (*Standardized Beta* =  $-.383,$   
14  $t_{(108)} = -4.284, p < .01$ ). All other variables were excluded from the model due to non-significance.

15 In a second analysis, we examined if the average sum value of CA has an influence on students’  
16 grading of the course. Independent variables were again all subscales. The dependent variable  
17 was the overall grade.

18 A stepwise regression model revealed a variance explanation of 15% ( $R^2 = .15, F_{(1,108)} = 19.44, p$   
19  $< .000$ ) by only one predictor “*CA overall*” (*Standardized Beta* =  $-.391, t_{(108)} = -4.441, p < .01$ ).

20 All other variables were excluded from the model due to non-significance.

### 21 22 Discussion and Limitations

23 SET is discussed controversially within higher education as well as in educational research. There  
24 are doubts about its usefulness and validity for both formative and summative purposes (Spooren  
25 et al., 2013). One major reason for these doubts is that the quality of teaching and the perspective  
26 of SET ratings are influenced by different aspects (e.g., teacher characteristics, learner  
27 characteristics, design of learning environments, etc.). We assumed here that the perception of  
28 Constructive Alignment contributes to overall academic course evaluation and, thus, may be an  
29 additional helpful instrument to SET in order to understand student ratings.

30 The first aim of this study was the design and validation of a questionnaire to assess students’  
31 perspectives on the dimensions of Constructive Alignment in academic teaching (Biggs, 1996).  
32 The results of an exploratory factor analyses revealed that the items of the three CA scales load  
33 on one factor each, with one exception: The factor loading for two factors (factor 2 and factor 3)  
34 is blurring. One explanation might be the theoretical overlap of these two scales. Both subscales

1 assess the fit between assessment tasks and teaching methods as well as ILO. It seems that  
2 students had here difficulties to distinguish between ILO and teaching methods. With regard to  
3 reliability of the subscales, the scores of internal consistency showed acceptable values for all  
4 subscales.

5 The questionnaire was applied with in an introductory lecture in educational psychology. The  
6 overall learning objectives included here to get introductory overview over principles, theories,  
7 models, application and research of educational psychology. The instructional approach was here  
8 a genuine teacher-directed lecture and the exam consisted of multiple-choice questions and short-  
9 essay tasks that were aimed to a) represent the ILOs of the lecture and b) to remain on a basic  
10 taxonomic level of *knowing* and *understanding* (Krathwohl, 2002). We aimed on validating the  
11 CA subscales by predicting the students' overall course evaluation. Results reveal here that none  
12 of the subscales of the course evaluation instrument was able to predict the overall evaluation  
13 score. This might be due to a poor internal consistency of the subscale *Scope and Relevance*, but  
14 does not explain why all other scales like *Teacher Characteristics* or *Form and Structure* did not  
15 contribute to explanation of variance as they did in prior research (e.g., Zumbach et al., 2007).  
16 The only significant predictor with a fair explanation of variance was here the CA-subscale *Fit*  
17 *between ILO and Instructional Methods*. It seems that the way of how the rather isolated  
18 assessment at the end of the term was experienced did not contribute to the overall experience of  
19 the learning environment. It is likely that the exam was not experienced by students as part of the  
20 learning environment, but rather as an "appendix" at the end of the term. Another explanation  
21 might be that the final exam is accepted by students "as is", because the form of the written  
22 assessment (multiple-choice and short open questions) is a common approach at the institution  
23 where the study was conducted. A missing experience of alternative assessment approaches could  
24 have biased students' ratings. Nevertheless, the experience of a synchronisation between ILOs  
25 and instructional methods seemed to be a good indicator for overall assessment of the course.  
26 Results reveal here that the pre-service teacher students in this study seemed to prefer a course  
27 where the taxonomy level to be achieved is supported by corresponding teaching approaches.  
28 This might be, on one hand, rather trivial: the use of complex, learner-centred approaches for  
29 basic taxonomy levels like knowing or understanding might be an over-complication of the  
30 learning environment, whereas the use of teacher-centred approaches for higher order levels like  
31 problem-solving or creating might be an over-simplification. Nevertheless, on the other hand the  
32 amount of learning objectives as pre-given in curricula or syllabi very often leads to the latter one  
33 in daily academic teaching practice. Thus, the match between ILO and instructional methods is  
34 experienced as a crucial aspect when judging course quality.

1 With regard to correlations, results reveal that many of the different subscales are assessing  
2 similar constructs. It has to be noted that the interpretation of the correlations has to be done  
3 carefully, because the number of correlations as presented here is problematic due to an Alpha-  
4 Error-Accumulation. There are medium to high correlations within all subscales of each  
5 questionnaire, but only single correlations among subscales from both instruments. These single  
6 correlations indicate that some aspects of the course evaluation are stronger related to some  
7 subscales of CA than others. Both CA subscales dealing with ILOs are related to dimensions of  
8 course evaluation that rather focus on form, structure, teacher and especially learning outcomes,  
9 whereas the perceived scope and relevance of the course was only correlated with the fit between  
10 assessment and instructional methods. This indicated that both concepts are related, but not the  
11 same. In addition, results indicate that the lecture and its assessment were perceived as a rather  
12 common approach. Students are experienced to this way of teaching and examinations. And very  
13 often they are lacking of a kind of perspective how the content might contribute to their further  
14 and future professional development. Thus, the scope and relevance might also be restricted to  
15 this perspective: the scope and relevance of the content is given when the teacher “teaches to the  
16 test”.

17 The questionnaire developed here does not differentiate between academic disciplines and  
18 between different course formats. This allows to examine the relation of CA and course  
19 evaluation across fields and course formats (e.g., lectures, seminar, practicals, trainings;  
20 continuously assessed vs. none continuously assessed; different amount of credits), instructional  
21 approaches, and different assessment types. Nevertheless, there are a lot of different influences on  
22 SET as well as on students’ learning and learning behavior which should not be neglected. In our  
23 research, as a matter of time and resources, we were not able to take a look on correlations  
24 between students’ objective grades for the course and the evaluation. For this sample, ethical  
25 issues and university policy did not allow obtaining person-related data about their exam grade,  
26 but subsequent work is planned to find here possible solutions.

27 Limitations to our study are that our results only represent a small sample size and for further  
28 research an overall scale for measuring students’ perspective on CA should be included into the  
29 questionnaire. Additionally, there have to be small changes to the design of the study. Students  
30 may not remember the ILO at the end of the semester, so for further research it will be necessary  
31 to tell, explain or ask students again about the ILOs before handing out the questionnaire. This  
32 might help students to better reflect on the course and if the course took the three dimensions of  
33 CA into account.

1 The study presented here is a first attempt to assess the dimensions of Constructive Alignment  
2 within the field of educational psychology and might be used as supplement for existing SET  
3 instruments.  
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Table 1: *Factor analysis and factor loading*

Item	Fit between instructional methods and content	Fit between learning objectives and assessment	Fit between assessment and instructional methods	Flexibility in adjusting instructional methods
1	<b>-0.46</b>	-0.05	0.34	-0.09
2	<b>-0.70</b>	0.25	-0.20	0.01
3	<b>-0.74</b>	0.13	0.09	0.33
4	<b>-0.60</b>	-0.07	0.43	0.14
5	<b>0.76</b>	0.22	0.01	0.13
6	0.12	<b>0.70</b>	-0.37	-0.07
7	0.17	-0.19	<b>0.52</b>	-0.52
8	-0.13	-0.14	<b>0.79</b>	0.01
9	0.13	<b>0.64</b>	-0.53	-0.09
10	-0.07	-0.01	<b>0.82</b>	-0.11
11	0.32	<b>0.75</b>	-0.22	0.02
12	0.13	<b>0.68</b>	0.21	0.26
13	<b>0.56</b>	0.40	0.07	0.19
14	0.22	<b>0.60</b>	-0.01	0.23
15	0.06	<b>0.48</b>	-0.07	0.61
16	0.44	0.24	0.01	<b>0.68</b>
17	-0.08	0.06	-0.01	<b>-0.63</b>
18	<b>0.59</b>	0.15	0.02	0.49
19	-0.53	-0.05	0.25	<b>-0.61</b>

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1 Table 2: Mean values, standard deviation and cronbach's alpha values of all scales

Scale (Items)	M	SD	Cronbach's Alpha
<b>Constructive Alignment</b>			
Instructional Methods and ILO (5)	3.59	0.74	.75
ILO and Assessment (5)	3.87	0.81	.75
Assessment and Instructional Methods (5)	3.24	0.42	.76
Flexibility in adjusting Teaching Methods (4)	3.16	0.45	.82
<b>Overall Course Evaluation</b>			
Form and Structure (4)	4.09	0.74	.76
Teacher Characteristics (4)	4.24	0.74	.80
Scope and Relevance (3)	3.77	0.72	.44
Learning Success (3)	3.78	0.84	.76
Grade (1)	2.74	1.10	-

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1 Table 3: *Bivariate Correlations*

2

Variable	1	2	3	4	5	6	7	8	9
1 Instructional Methods and ILO		<b>.39**</b>	.14	.28**	<b>.49**</b>	<b>.44**</b>	<b>.39**</b>	<b>.34**</b>	<b>-.37**</b>
2 ILO and Assessment			.27**	.05	<b>.31**</b>	<b>.39**</b>	<b>.49**</b>	.27**	<b>-.28**</b>
3 Assessment and Instructional Methods				.01	.17	.24*	.21*	<b>.45**</b>	<b>-.20*</b>
4 Flexibility in adjusting Teaching Methods					.24*	.17	.17	.13	-.12
5 Form and Structure						<b>.58**</b>	<b>.53**</b>	<b>.49**</b>	-.15
6 Teacher Characteristics							<b>.47**</b>	<b>.48**</b>	<b>-.23*</b>
7 Learning Success								<b>.62**</b>	<b>-.23**</b>
8 Scope and Relevance									<b>-.19*</b>
9 Overall Grade									

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*Comment: \* p < .05, \*\* p < .01. Correlations higher than .30 (p < .001) are highlighted.*

1 Appendix 1: Questionnaire for students' perspective on Constructive Alignment

2

3 Fit between instructional methods and ILOs:

4 The instructional methods were not oriented on the ILOs. (-)

5 The instructional approaches matched with the ILOs.

6 The methods used by the teacher were constantly in relation to the ILOs

7 Thinking about the ILOs, I think the wrong teaching method was taken.

8 The instructional methods were adapted to the ILOs.

9

10 Fit between ILOs and assessment tasks

11 The ILOs of the course matched with the given assessment tasks of the course.

12 The ILOs were not part of the assessment task. (-)

13 In the assessment tasks, questions about ILOs were included, but they have not been part of the course at  
14 all. (-)

15 The chosen assessment tasks for this course are closely related to the ILOs.

16 The assessment task and the ILOs were not related to each other. (-)

17

18 Fit between assessment tasks and instructional methods

19 The assessment tasks and the way the ILOs were implemented in the course matched perfectly.

20 ILO on a "practical level" have been taught and tested in a practical way; ILOs on a theoretical level have  
21 been taught and tests in a theoretical way.

22 The assessment tasks were always adapted to the teaching method.

23 If understanding of content was required in class, the assessment task was also about the understanding of  
24 the content.

25 Switching between different instructional methods was also considered within the assessment tasks.

26

27 Flexibility in adjusting instructional methods

28 The teacher changed his/her teaching methods, depending on the ILOs?

29 The teaching method was always the same; even there was a great variety on the taxonomy of the ILOs.

30 The teacher was very flexible in switching between different teaching approaches.

31 The teacher always used the same teaching methods.

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