

PACIFIC JOURNAL OF MEDICAL SCIENCES

{Formerly: Medical Sciences Bulletin}

ISSN: 2072 – 1625



Pac. J. Med. Sci. (PJMS)

www.pacjmedsci.com. Email: pacjmedsci@gmail.com.

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COMPONENT IN AN UNDERGRADUATE MEDICAL EDUCATION PROGRAM AT THE UNIVERSITY
OF PAPUA NEW GUINEA: Constructive Alignment in Course Design.**

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Submitted: November 2021; Accepted: February 2022

A REFLECTION ON CONSTRUCTIVE ALIGNMENT OF THE COMMUNICATION SKILLS COMPONENT IN AN UNDERGRADUATE MEDICAL EDUCATION PROGRAM AT THE UNIVERSITY OF PAPUA NEW GUINEA: Constructive Alignment in Course Design.

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ABSTRACT:

The University of Papua New Guinea (UPNG) undergraduate medical education curriculum is problem-based and grounded in constructivist learning theory. This theoretical foundation provided the springboard from which the 'communication skills' component, taught in the curriculum was redesigned using constructive alignment (CA). Introducing a change into what is taught and how it is taught warranted a reflection to determine whether the innovation was worthwhile. To this end, reflective practice was employed through document analysis to assess the degree to which CA was achieved across all core elements of the course. Results were then analysed by combining elements of both content and thematic analysis. The teaching and learning activities (TLAs), seminars and assessment tasks (ATs) were found to be not clearly articulated and constructively aligned to the course learning outcomes (CLOs). This resulted from not clearly articulating the expected targeted knowledge and skills in the CLOs. This, in turn, had the effect of highlighting the importance of ensuring that the nominated verbs in each CLO were used to establish alignment between the learning outcomes, TLAs and ATs. The findings indicated the need to rectify the problems identified using CA as the learning improvement plan and adjusting TLAs as the means of achievement.

Key words: Constructive alignment, curriculum design, constructivist theory, problem-based learning, self-directed learning, teaching strategies, reflection, reflective practice

INTRODUCTION:

Constructive Alignment (CA) in Course Design:
Constructive alignment (CA) is a curriculum design and teaching strategy using outcomes-based approach in which the learning outcomes that students are expected to have

achieved at the end of a particular course, subject or unit are clearly stated before teaching takes place. Teaching is then designed to engage students in learning activities that will optimize their chances of achieving those learning outcomes, and

assessment tasks are designed to enable students to clearly judge how well they have attained those outcomes [1]. The terms “course”, “subject” and “unit” are used in different higher education institutions and they mean the same and refer to the different curricular elements. They are defined as one element of many that constitute a larger degree program of study [2]. In the undergraduate medical problem-based learning (PBL) program at the University of Papua New Guinea (UPNG), the program objectives are clustered into five domains and full-time students enroll in these domains each year [3]. Domains are similar to core courses of a program because they are assigned specific course numbers. Country specific health problems are then, used as the main criteria to select the problems which are delivered as “Patient and Community” (P & C) problems that students work on in small tutorial groups each week. These are similar to the main topics of a course and they are supported by “Learning Issues” which are brief reviews written by faculty to help students solve the P & C problems. Other topics related to each P & C problem are also selected and delivered as seminars, practical classes, clinical activities, and exercises in critical reasoning, which interface with all the domains. These are referred to as “Components” in the program [3]. Communication Skills is a cross-cutting component relevant to all P & C problems and delivered both as a seminar and practical class

under Public Health domain (Domain 1) and taught throughout the whole undergraduate medical program (Years 2 – 5).

In CA, the core elements of a course, subject, unit or component that need to be aligned are course learning outcomes (CLOs), teaching approaches (TAs), learning activities (LAs) and assessment tasks (ATs) [2]. These need to be clearly defined, articulated and constructively aligned before teaching takes place. CLOs define the specific knowledge and skills students should learn. They also define how the contents and topics are to be dealt with and in what context. TAs are the specific types of work teachers do to promote student learning; for example, lecturing or leading discussions. LAs are the specific types of work students are assigned by the teacher in order to learn, individually or in groups, for example, discussing assignment questions/problems. ATs are the specific types of work teachers design and students carry out to demonstrate the quality and quantity of their learning in order to gain formative feedback or summative marks [2]. Jones and Biggs’ [1, 4] argument concerning CA is that, for students to be engaged in a deeper process of learning, processes that are related to learning objectives, learning activities and assessment must be aligned. It was also noted that such alignment should favor criterion-referenced assessment rather than norm-referenced assessment. This in effect suggests when course content related to specific learning

outcomes employs pedagogical perspectives and techniques which, over time, are tested using criterion-base assessment, an iterative process emerges where any element of teaching delivery can be adjusted to further enhance student learning [1, 4]. In terms of the component which is the subject of this paper, the ongoing effects of teaching and learning have proved this perspective to be true. The CLOs, TLAs, ATs and the seminar contents of the component continues to be reviewed to ensure there is appropriate alignment between them.

Constructivist Theory and the UPNG Undergraduate Medical PBL Program:

The UPNG undergraduate medical education program adopts a fully problem-based and integrated instructional method using problem-based learning (PBL) which has a strong community health orientation. The emphasis is on self-directed learning approaches and development of independent learning skills [3] to foster “key skills of researching, acquiring knowledge, communication, collaboration, problem-solving and transferring knowledge to new situations” [5]. Students work on the weekly P & C problems which are open-ended clinical scenarios using multiple sources of guided information in small tutorial groups. There are also other P & C problem related components that are delivered as seminars, practical classes, clinical activities, and critical reasoning exercises which are referred to as

“formal support structures” [5] in a PBL curriculum. They provide opportunities for “just-in-time learning” [5] to help students work on the clinical problems presented in the scenarios. This means that relevant materials that students need to solve the P & C problems are presented to them in a timely manner through these support structures. If the contents of the formal support structures are presented out of context, or for some unspecified possible future use, students may not appreciate the importance of the information or activity, which may affect their motivation to learn and retain the learning [5].

The first step in PBL is to identify the key learning outcomes of a course as this is critical to the development of content and assessment and this need to be clearly understood by both teachers and students for effective learning to take place. The components of the domain can then be refined and the problem and relevant resources for delivery can be woven together [5]. The weaving process in the UPNG undergraduate medical PBL curriculum uses CA. This ensures that each element of planning the PBL curriculum sees methods and resources chosen for teaching and learning delivery in all courses and components produce a coherently constructed PBL program. This requires an emphasis on self-directed learning and the development and use of independent learning skills. It should be noted that here the CA is informed by constructivist theory [1].

Firmly establishing a learning theory, framework or model and using that as a springboard to design a course is a requirement for planning and initiating any Scholarship of Teaching and Learning (SoTL) project. This is because SoTL places heavy emphasis on the use of a framework, model or theory to drive the directions of any change in curriculum [6]. The onus then rests on the discipline professional who teaches into the program to be wary of the design choices he/she makes overall, and in relation to each core element as these choices can raise or lower the odds that students will learn deeply and well [2].

Justification for this study:

The presence of a clear learning theory to underpin course design strategy program which is constructivist theory [1] was intriguing and this triggered a critical examination into aspects of the design of the course structure and teaching and assessment practices for all the courses taught. The examination revealed fertile ground for application of the learning derived from tertiary teaching studies. Previously undetected disconnections between the core elements of the courses, particularly, alignment between the CLOs, TLAs and ATs were noted. The degree of disconnection varied, but provided ample motivation to revisit all of the courses to ensure that appropriate CA was implemented. Prioritization of the courses for further in-depth examination revealed that

the Communication Skills component was in most need of attention. This component is one of the formal support structures that provides just-in-time learning opportunity for students [5] in Public Health domain of the UPNG undergraduate medical PBL program. Hence, the redesigning of the component was initiated beginning with the Year 2 component. A reflection was then carried out to determine the degree to which the core elements of the component were articulated and aligned, which is the focus of this study.

Thus, the aims of this study were to assess the degree to which CA was achieved across all core elements of the Year 2 Communication Skills component and to determine whether or not these core elements were clearly articulated and constructively aligned at the component level.

The ethical approval for this study was given by the James Cook University Ethical Committee with approval number H7065.

METHODOLOGY:

The reflection by both teachers and students is an important part of the PBL learning process. It is considered a key part of any PBL implementation and assessment plan. Reflective practice helps to develop and hone facilitation and teaching skills [5] and enables the teacher to critically reflect on existing understandings, beliefs, assumptions and attitudes and create a safe learning

environment to nurture reflective expression [7]. The “5Rs reflective scale” (Reporting, Responding, Relating, Reasoning and Reconstructing) [5] was used to guide the reflective practice as part of the continuous course improvement strategy as this scale was seen to be the simplest and easy to use. Frameworks that can be used to develop teacher reflection abound in the literature but for a small scale reflective study such as this project, the 5Rs scale was seen to be the most appropriate scale to use.

Reporting:

As a beginning step, a systematic inquiry and critical examination was carried out into the existing curricula for the Public Health domain, which was developed in 1996 [8]. The overall teaching and learning objectives were defined for each level (year) but they were not articulated in detail as to how the set objectives would be achieved through the main components of the Domain. Individual seminars under each main component of the Domain were clearly defined and aligned to the relevant P & C problems at each level but they were not articulated in detail. The document was meant to be an outline of the Public Health Domain (course) for those teaching into the domain to use it as a guide to further develop their respective components. Therefore, based on this domain outline and experience and also practical circumstances within a hospital setting, a communication skills curriculum was

developed and it was in use until tertiary teaching studies provided exposure to the foundational knowledge and skills associated with core aspects of university teaching and learning, and enabled creativity and innovation in utilizing research informed teaching and learning strategies to improve student learning.

Responding:

During the inquiry and examination of the existing curricula it was observed that the communication skills components, which are taught throughout the whole undergraduate medical PBL program (Years 2 – 5) were not integrated into any of the main P & C problems that students work on each week, which according to the public health domain outline [8] the individual components were supposed to be covered under the relevant P & C problems. Instead, the component was expected to be taught separately. However, the reason for the component not being integrated into the main P & C problems was because the course was a cross-cutting component that needed to be carefully developed to capture just the essential learning that students would require to solve the clinical problems and also apply in the real world.

Relating:

The challenge in the communication skills component not being integrated into the main clinical scenarios created the opportunity to redesign the component using CA as the

concept behind the learning improvement plan, and adjusting the teaching and learning activities as the means of achievement.

Reasoning:

The inquiry and examination revealed serious disconnections between the core elements of the communication skills component, particularly with clearly defining, articulating and alignment to the learning objectives stipulated in the public health domain outline. The component needed proper designing with appropriate alignment of the core elements at the component level.

Reconstructing:

Re-designing of the whole communications skills component began with the Year 2 component, and the eventual reflection on the initiated change with 'reflection' being the main focus of this study.

The reflection took place within the very performance itself (performance being, the redesigning of the component), which is referred to as "reflection in action" [9].

This type of reflection is possible if there is mental processing capacity available to accumulate and evaluate immediate feedback within the performance context. It allows learning to become apparent within the performance, and also allows the modification of the performance plan to make it more efficacious [9].

Data collection and analysis:

Data was collected through document analysis [10]. The analysis of the core elements of the redesigned communication skills component was carried out appropriately. The reflections and review focused mainly on the articulation and alignment of the core elements, which were, CLOs, TLAs, ATs and seminars. The reflections were to determine whether or not these elements were clearly defined, articulated and constructively aligned at the component level.

The data analysis process combined elements of both content and thematic analysis. In content analysis, the categories under which the reflections would be organized were already provided by way of the core elements; hence all responses of the reflections were recorded under the respective core elements (categories). The combined responses were quite dense and rich, thus the "winnowing" process was used to single out responses that were pertinent and directly related to CA in course design and organized them under the same respective core elements [10].

In thematic analysis, the narrative nature of the study (telling a story about the articulation and alignment of the core elements of the redesigned component) warranted a pattern to be identified based on certain characteristics of the winnowed responses. Hence, this process involved a careful and a more focused re-

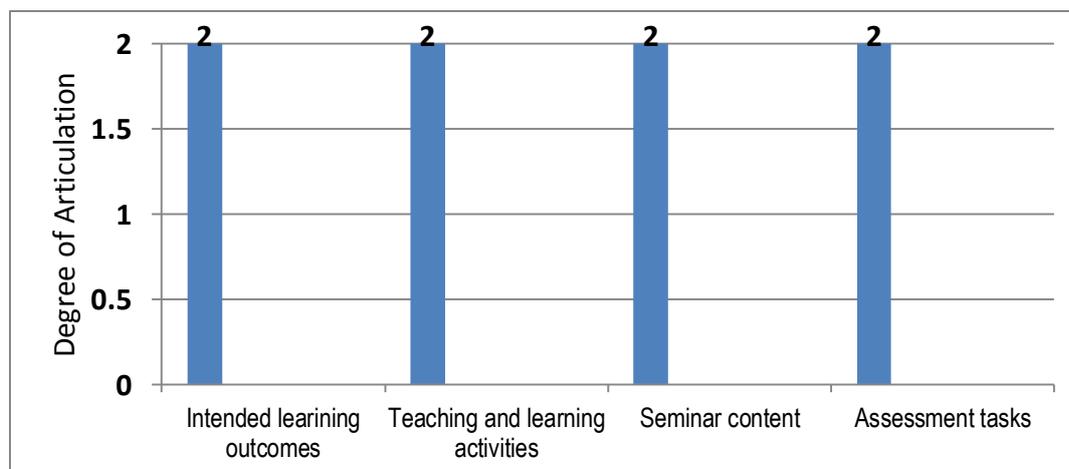
reading and review of the winnowed responses and identified a pattern based on the following characteristics – key words, descriptive phrases and brief comments. These three key characteristics guided the construction of sub categories under each main core element which in turn helped to establish a clear flow of the narrative about the articulation and alignment of the core elements of the communication skills component

RESULTS:

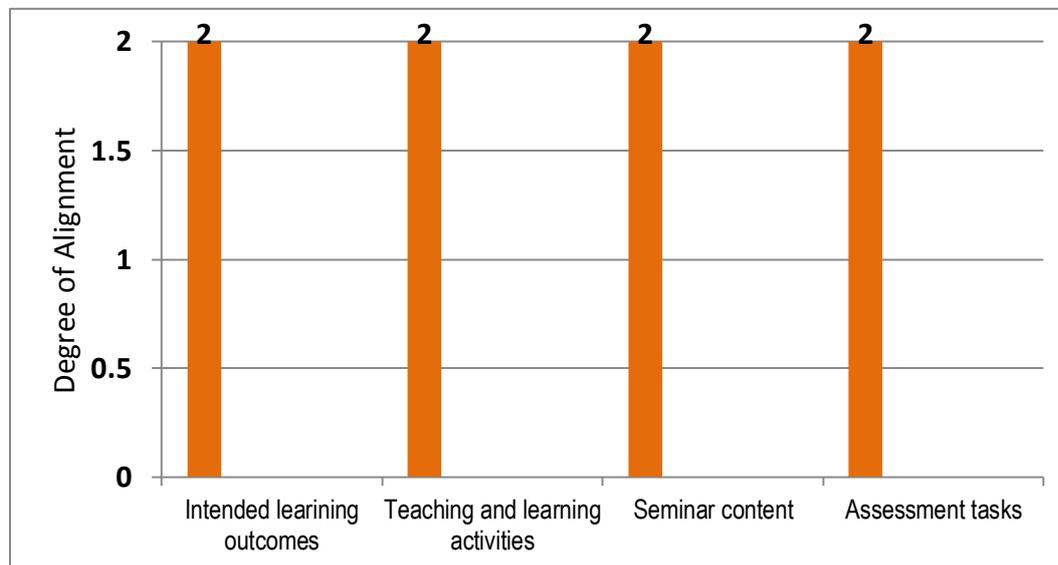
Figures 1 and 2 show the degree to which articulation and alignment of the core elements of the component were achieved. As the results show, the degree of articulation and alignment for all core elements stand at 2, these indicate that they were not clearly articulated and not constructively aligned. This means that for the CLOs, the targeted knowledge and skills that

the students were supposed to have acquired at the end of the component were not clearly articulated. The nominated verbs in the CLOs did not become common links that established alignment between TLAs, ATs and seminars. For the contents of the TLAs, they were not clearly articulated and aligned to the CLOs. There was also no clear common link that established alignment between the CLOs and TLAs. For the ATs the nominated verbs in the CLOs that students would enact were not clearly articulated in the contents of the ATs. The contents of the ATs also lacked clear alignment to the CLOs. The verbs nominated in the CLOs that students would enact were not clearly articulated in the contents of the seminars. The contents of the seminar notes were not aligned to the CLOs and there was no clear common link that established alignment between them.

Figure 1: Articulation of the Core Elements of the Year 2 Communication Skills Component



1 = Not Articulated; 2 = Not Clearly Articulated; 3 = Clearly Articulated; 4 = Very Clearly Articulated

Figure 2: Alignment of the Core Elements of the Year 2 Communication Skills Component

Key to Fig 2: 1 = Not Aligned; 2 = Not Constructively Aligned; 3 = Constructively Aligned

DISCUSSION:

Course Learning Outcomes (CLOs):

Although the CLOs in the present study were framed from the perspective of student learning and they addressed one discrete action per outcome, the expected targeted knowledge (knowledge of basic principles of effective communication) and skills (acquisition of basic communication skills) were not specifically articulated in the CLOs. It also appeared that the expectations of the nominated verbs (recognize and acquire) in the CLOs were at a higher level of the cognitive taxonomy [11], thus inappropriate at the current level. According to Krathwohl [11] the different categories of the cognitive domain (knowledge, comprehension, application, analysis, synthesis and evaluation) in both the original and the

revised taxonomy frameworks are ordered from simple to complex and from concrete to abstract and assumed to represent a cumulative hierarchy. This implies that mastery of each simpler category is a prerequisite to mastery of the next more complex one. Hence, the original intentions for developing cognitive taxonomy frameworks were not well captured in the framing of the learning outcomes in the communication skills component. The verbs nominated in the CLOs should be at a low level of the cognitive taxonomy and the levels can be increased when redesigning the Years 3, 4, and 5 components respectively. In addition, the nominated verbs in the CLOs become the common link that establish alignment between the CLOs, TLAs and ATs. In this component the CLOs were not clearly defined and aligned,

that is, what the students were supposed to be able to do with the content they learnt were not clearly articulated thus affecting the alignment as well.

Teaching and Learning Activities (TLAs):

The case study materials (contents of the TLAs) in particular appeared to be detailed and engaging and showed clear alignment between authentic clinical scenarios and contents of the seminar. However, the nominated verbs in the CLOs were not clearly and specifically articulated in the TLAs. There was no clear common link that established alignment between the CLOs and the TLAs, although they were somewhat implied within the contents of the TLAs. According to Biggs [1, 12], the key is to clearly define and articulate what students are supposed to be able to do with the content they learn by carefully choosing or nominating the verbs that students would enact in the CLOs. Once this is in place, the appropriate learning activities can fall into place, and the teaching will be to get the students to engage or demonstrate those nominated verbs in the CLOs. This will ensure that the desired outcome is achieved in a reasonably effective manner. These articulation and alignments needed to be explicitly stated in the activity handouts and also explained to the students instead of implying within the contents of the TLAs. This will help students to see clearly that they are actually enacting the nominated verbs in the exercises they do.

Seminars:

Seminars in the UPNG undergraduate medical PBL program are formal lectures in which the knowledge that students need are presented to a potentially large number of students at one time. Contents of the seminars for different components in the different domains vary depending on their learning outcomes. For the communication skills component, the verbs nominated in the CLOs need to be clearly articulated in the contents of the seminars and aligned to the CLOs, which was not the case. Although the seminar contents in the slideshows supported understanding of the principles and processes associated with communication generally, the nominated verbs in the CLOs were not clearly articulated within the contents, though implied in some ways in the contents of the seminars. The seminar contents need to be reviewed in order to inform a more-sharper link to the CLOs.

Assessment Tasks:

The unfolding authentic case scenarios spread over the different trimesters that students engaged with through the role plays were elegant. However, the verbs nominated in the CLOs were not clearly defined and articulated in the contents of the ATs (role play scenarios), although they were alluded to in some way. Students needed to be fully aware and clear from the outset that they were enacting the

nominated verb(s) of the CLOs in their ATs but this clarity was lacking.

Generally, a CLO denotes how the contents or topics are to be dealt with and in what context [1, 12]. Hence, to begin with, the nominated verbs in the CLOs were not specifically articulated but to communication generally, which in turn affected the articulation of the context, for example, in a doctor – patient interaction. The most useful way of stating curriculum objectives is to express them in terms that identify both the kind of behavior to be developed and the context or area of life in which this behavior is to operate [1, 12].

CONCLUSION:

The results of this study showed that the core elements (TLAs, ATs and seminars) of the redesigned Year 2 Communication Skills component were not clearly articulated and aligned to the CLOs. The key issue with these results is to do with not clearly defining and articulating the nominated verbs in the CLOs, which in turn affected the articulation and alignment of the other core elements. The verbs that are nominated in the CLOs are the ones that are going to become the common link that establish alignment between the TLAs, ATs and the CLOs. Hence, the fundamental task for the teacher is to carefully select the verbs or actions in the CLOs that students are supposed to put into play and they must be at an appropriate level of the cognitive taxonomy. Once these are in place, appropriate learning

activities can be developed, ensuring that the nominated verbs or actions in the CLOs are clearly articulated in the contents of the learning activities. Teaching tasks can then be developed to get the students to engage in those learning activities that will enable them to achieve those learning outcomes; and assessment tasks are determined to judge how well students can perform the nominated verbs in the CLOs in appropriate contexts.

In the final analysis, the contents of the TLAs and ATs should address the same verbs that are nominated in the CLOs. This type of teaching design is called “constructive alignment”. The reflections in this study focused only on just within-component alignment. But if any effective self-directed learning and development of independent learning skills is to be promoted in an integrated curriculum such as the UPNG undergraduate medical PBL program, a whole-of-program alignment is desirable. For a cross-cutting component such as Communication Skills that has a strong program and extends through the PBL curriculum, the following recommendations should be considered if the component is to help promote effective self-directed learning and development of independent learning skills. Firstly, each of the problems identified in this study be analyzed and rectified through further reflective/action research using CA. Secondly, the component needs to be properly developed in a way that could promote student progressive learning

from one level/year to the next level/year – CLOs, TLAs and ATs need to be carefully developed and appropriately aligned and linked to each other at each level/year to promote coherent progressive learning. Finally, a whole-of-program alignment project can be undertaken which will be a mammoth task, given that the component is only a just-in-time-learning opportunity in a complex integrated curriculum.

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