

**Master's Thesis Educational Design and Consultancy
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**Curriculum Classification Principles and Procedures in
Higher Education: a Review Study**

Author: Evelyn Westerhoudt
Student number: 3069834
First supervisor: Casper Hulshof
Second supervisor: Jeroen Janssen
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Abstract

While there is a large amount of literature on curriculum matters, confusion may easily arise when trying to comprehend this literature. Therefore, the aim of this conceptual review study is to give guidance to curriculum developers when they conceptualise and organise curricula. The research question was: *Which curriculum classification principles and procedures for institutions of higher education can be identified?* Classification refers to the construction and maintenance of boundaries between curriculum contents; their interrelationships and stratification. Procedures are the steps to follow for the completion of a task, and principles are the rules of a process. Three curriculum classification principles and procedures for institutions in higher education were identified in this review study. Content classification puts emphasis on the identification, conceptualisation, and structuring of subject matters or content. Within the top-down approval classification, special committees are assigned to approve course proposals. Mapping classification can be divided in loosely-structured methods, or more structured mapping and clustering strategies, in order to identify the coherence within a curriculum. These classification principles and procedures can be used in addition to each other, or separately. The three-dimensional categorisation in this study reveals considerations for curriculum design processes.

Introduction

“The last decades there have been great challenges and considerable excitement for educational systems around the world” (Hopkins, 2001, p. 2). Worldwide, governments have demanded more effective school systems and increased levels of student skills. In addition, trends and issues, such as the rapid pace of change; the vast information need; internationalisation, and the increased diversity in society, have put pressure on educational institutions (Ornstein & Hunkins, 2009). As a result, the curriculum field of study, and the relevance of curriculum development and change have grown substantially. However, while there is a large amount of literature on the subject, according to Van den Akker, Kuiper & Hameyer (2003), and Jackson (1992), *confusion* may easily arise when trying to understand the literature on curriculum matters. In his Handbook of research on curriculum, Jackson (1992) summarises other complaints from curriculum observers, such as conflict, severe disorientation, and chaotic states of curriculum terminology. The latter involves the definition and meaning of the term curriculum. This curriculum confusion on terminology is exposed by Portelli (in Marsh & Willis, 1995), who discovered over 120 definitions in professional literature devoted to curriculum.

While The Longman Dictionary (2011) defines curriculum as “the subjects that are taught by a school, college etcetera, or the things that are studied in a particular subject”, Ornstein and Hunkins (2009) have made a distinction in five basic definitions of curriculum, based on different approaches. At first they identified a plan in order to achieve goals, also embodied in Tyler’s Rational-Linear approach. This view involves the sequence of the following steps: the selection of objectives and learning experiences, the organisation of learning experiences, and the evaluation of the effectiveness of learning experiences (Marsh & Willis, 1995). In the second approach, curriculum is more broadly defined and deals with the learner’s experiences. This view is rooted in Dewey’s philosophy of experience and education (Sawyer, 2004; Ornstein and Hunkins, 2009). Whereas Sawyer (2004) interprets Dewey’s philosophy on curriculum as interaction between students and instructors, according to Ornstein and Hunkins (2009) all the planned activities in or outside a school, are curriculum elements. The third approach characterises curriculum as a system for dealing with people, and approach number four describes curriculum from a more theoretical point of view, as “a field of study with its own foundations, knowledge domains, research, principles, and specialists” (Ornstein & Hunkins, 2009, p. 11). Within the fifth approach, curriculum is classified as a subject matter or content, which involves the organisation and clarification of information. Whereas Tyler’s approach is still widely used in a number of countries, it has been criticised because it does not address educational purposes. Only when decisions are made about *what* educational institutions want to teach, content and teaching activities can be selected and organised (Marsh & Colin, 2008). Furthermore, the third and fourth approach do not provide much guidance in order to develop a curriculum.

In addition to the confusion on curriculum terminology, the lack of appropriate curriculum theories does not clarify the field of curriculum either. According to Marsh and Willis (1995),

curriculum theories are *gritty* and *ragged*, which is not helpful for making decisions in the curriculum field. A theory can be defined as a set of ideas in order to explain something, general propositions or principles about a subject, an organised system of accepted knowledge, or a guess (Longman Dictionary, 2011; Glossary.com, 2011; Marsh & Willis, 1995). The latter description is a major source of curriculum difficulties and challenges. Whereas the intention is clear, curriculum theories should guide curriculum developers in curriculum planning and development, there seems to be (a) a lack of scientific generalisations and (b) a gap in the specific translation from theory to curriculum practices (Marsh & Willis, 1995). Due to the inconsistency in literature about curriculum theories, curriculum planning and development can be frustrating and chaotic, even to experienced developers. This might lead to a lack of curriculum theories in the planning and development of curricula.

Curriculum development is identified by Behar (in Ornstein and Hunkins, 2009) as one of the nine curriculum domains, namely the accepted knowledge presented in published articles and books. The other domains entail curriculum philosophies, theories, research, history, design, evaluation, policies, and curriculum as a field of study. Curriculum development refers to the people, processes, and procedures involved in the planning, implementation, and evaluation of the curriculum construction. Due to the wide connotations of the term curriculum development, one should clarify its specific aims, associations, and processes involved. According to Marsh and Willis (1995), Instructional Design and curriculum development cannot be separated from each other, however Seel and Dijksta (2004) make a clear distinction between the two disciplines. They interpret Instructional Design as a method of teaching contents in a subject area, and curriculum development as the content itself. Even though the subjects are similar, Instructional Design and curriculum development are not closely related, since they are characterised by separate literature, argumentation lines, and knowledge bases (Seel and Dijksta, 2004).

Closely related to curriculum development is the term curriculum design: the conceptualisation and the organisation of the objectives, content, learning experiences, and evaluation (Ornstein and Hunkins, 2009). The definitions *development* and *design* are also often mixed up. Nonetheless, curriculum design can be a helpful source in the translation from curriculum theories to curriculum practices. Therefore, *the aim of this research is to give guidance to curriculum developers (people who make curriculum decisions) when they conceptualise and organise curricula, by identifying, comparing, and analysing the curriculum organisation of educational institutions.* According to Jackson (1992), curriculum organisation represents decisions on scope, continuity, sequence, and integration. Other design considerations are articulation and balance (Ornstein & Hunkins, 2009). Scope refers to the breadth and depth of the content, the horizontal organisation. Continuity can be seen as the vertical repetition of themes or skills. Sequence is the vertical cumulative, continuous learning experience, and integration is the relationship between types of knowledge within the curriculum. Articulation is the horizontal and vertical interrelatedness, and balance is the appropriate weight of curriculum elements. In this study, design considerations will be

addressed, and classification will be used as a synonym for the organisation of a curriculum. “Classification is the construction and maintenance of boundaries between curriculum contents; their interrelationships and stratification” (Ross, 2000, p. 98).

By using a conceptual review, the following research question will be answered: *Which curriculum classification principles and procedures for institutions of higher education can be identified?* Principles are the rules of a process (Longman Dictionary, 2011), and a procedure is a series of steps one must execute for the completion of a task (Morrison, Ross & Kemp, 2007). The higher education scope has been selected, since there is a relatively small amount of curriculum literature in higher education (Barnett & Coate, 2004). Institutions of higher education include universities where the process of teaching and learning on a bachelor or master level takes place. The phrase *can be identified* refers to critical analyses and empirical evidence; either the experienced appliance or the evidence-based recommendations for higher education, in literature. The research question has resulted in the following sub-questions:

(A) *Which models and methods for the construction and organisation of curriculum contents in higher education can be identified?* To gain more insight in classification principles and procedures, the existence of methods (planned actions) will be explored. To fully understand the context of the planned actions, underlying curriculum models will be identified. Curriculum models identify fundamental deliberations, and the interrelationship of curriculum decisions (Marsh & Colin, 2008). Even though a distinction can be made between models (conceptualisations) and algorithms (procedures), since the difference is ambiguous, algorithms will be inserted in the definition of curriculum models. In the United Kingdom, Ross and Kelly (in Marsh & Colin, 2008) refer to content-driven and process-driven curriculum models. Some American scholars have identified four groups of curriculum models: the procedural approach (steps to follow), the descriptive approach (actions of curriculum planners), the conceptual approach (curriculum planning elements), and the critical approach (social structures) (Marsh & Colin, 2008). (B) *Which standards for the construction and organisation of curriculum contents in higher education can be identified?* In order to fulfil the aim of giving guidance to curriculum developers, clarification of standards is essential. Standards usually refer to the measurement of learners’ performances (Flinders & Thornton, 2004; Ornstein & Hunkins, 2009), though standards for curriculum classification refer to criteria to ensure a profound quality level of curriculum design. They can include the selection or content determination for horizontal and vertical organisation, integration, and balance. (C) *Which difficulties or challenges for the construction and organisation of curriculum contents in higher education can be identified?* By exploring potential difficulties and challenges, curriculum developers might be better prepared for curriculum in action.

Methodology

A systematic review can be used for the identification of all relevant studies to answer an explicit question, and assess the validity of these studies involved (Petticrew & Roberts, 2010). Quite often, systematic reviews address questions about effectiveness and causal associations. The research question: *Which curriculum classification principles and procedures for institutions of higher education can be identified?* has a descriptive and an explorative side. The aim of the research question is to provide an accurate description of classification principles and procedures. In addition, it tries to reveal and explore relationships among curriculum models, methods and standards. For that reason, hypotheses were not formulated in advance. Another type of review study is the conceptual review, which aims to synthesize areas of conceptual knowledge for a better understanding (Petticrew & Roberts, 2010). It has seemed appropriate, referring to the descriptive and explorative nature of the study, to adapt the conceptual review for this research study. Hence, the data were collected through a systematic approach.

Inclusion and exclusion criteria

Inclusion and exclusion criteria portray the types of study, interventions, populations, and outcomes for review studies (Petticrew & Roberts, 2010). This study includes qualitative studies, such as case studies, grounded theory studies, theoretical analyses, surveys, evaluation and action research, which portray curriculum classification principles and procedures. Interventions, such as curriculum development, design, and implementation, have been components for the inclusion criteria, since they determine the scope of this review. Studies have been excluded if the conclusions and discussions were not directly related to classification principles or procedures (methods, models, standards or difficulties), because studies that only report on classification issues, without drawing any conclusions, have been considered too limited for this review. Another inclusion criterion has been the higher education context of the studies: universities that educate bachelor and master students, either regular fulltime or part time, or via distance learning. All primary, secondary or PhD programmes have been excluded. The content of primary and secondary education has been legislated by Government, which has limited the influence of the curriculum developers for this review too much, and PhD programmes do not encompass an entire curriculum. Due to the specific setting, studies have been excluded if the educational context incorporated special education: programmes for people with singular needs or disabilities. No geographical boundaries have been set in this review, since the aim is to give guidance to curriculum developers, and one may learn from experiences on different continents. For a complete overview, geographical origins are addressed in this report. To portray the current situation on curriculum classification principles and procedures, only literature published between 1 January 1990 to 31 March 2011 has been included. Finally, only articles published in English have been included.

Search Strategy

The search question has been formulated as follows: *Which English written research on curriculum classification principles and procedures in higher education since 1990 can be found in a selected group of databases?*

Pre-research Definitions

The definitions *curriculum* and *higher education* have appeared to be essential for this review study. Curriculum relates to the educational setting, and without this term, results on classification principles and procedures would not have been obtained. Higher education has also proved to be a vital term, since the context of the research was established in it. The definitions *classification principles* and *procedures* have seemed too specific; therefore the more general term *design* has been included. Design, as well as standards were non-essential terms for each database-search. The exploration of several online educational dictionaries and glossaries (Dictionary of Education, 2011; North Central Regional Educational Laboratory, 2011; Office of the Education Ombudsman, 2011; School Wise Press, 2011; Training and Development Agency for Schools, 2011; Wordsmyth, the Premier Educational Dictionary – Thesaurus, 2011) has resulted in 76 synonyms and related terms. These synonyms have been useful for the selection of relevant reports.

Databases and Keyword Selection

In May 2011, a search was carried out in full-text publications, published between January 1990 and April 2011, within five databases: Omega (Utrecht University Library, 2011), Academic Search™ Premier, Education Research Complete, Education Resource Information Centre (ERIC), and Teacher Reference Center; the latter four provided by EBSCOhost® (2011). These databases were selected due to their educational content and the full accessibility for the author. After some initial efforts to improve the search strategy, it turned out to be challenging to find relevant information. For that reason, a vast amount of search terms was used in a combination (OR), instead of separate terms that all needed to be found (AND). Initially, the option to select *apply related words* in EBSCOhost® (2011) had been considered, this was later rejected because it led to almost 8000 results. After the examination of all subject terms in EBSCOhost® (2011), the literature search was executed based on three groups of relevant subject terms (see table 1).

By selecting additional limiters in EBSCOhost® (2011), the review results became more specific. Limiters for Academic Search™ Premier were: publication type (book, educational Report), and document type (article, book chapter, case study, report). Limiters for Education Research Complete were: publication type (academic journal), document type (article, case study, report), and language (Dutch/Flemish, English). Limiters for ERIC were: educational level (adult basic education, adult education, higher education, postsecondary education), and publication type (books, all dissertations, ERIC digests in full text, ERIC publications, journal articles, all reports). No relevant

limiters for Teacher Reference Center were selected. To increase the reliability and prevent accidental typing errors, the search was carried out at two computers simultaneously.

Since the database Omega (Utrecht University Library, 2011) did not have the option to select subject terms, the search was carried out with more keywords, adapted from the prior dictionary and glossary exploration. Two clusters of keywords within abstracts, and two clusters of keywords that were present at any location in the document, were created (see table 2). Additional limiters, such as disciplines (education, pedagogy), and document type (article, E-Book, dissertation, digitalised book, report) were selected.

Table 1

Selected keywords and field options in EBSCOhost® (2011)

Subject	AND Subject	AND Subject
Curriculum OR Curricula	Education, higher OR Postsecondary education OR Universities & colleges	Design OR Development OR Change OR Implementation OR Evaluation OR Planning OR Improvement OR Restructuring OR Course OR Annehurst curriculum classification system OR Horizontal organisation OR Reforms OR School improvement programs OR School restructuring OR Sequential approach OR Student centred curriculum OR Vertical organisation OR Standards OR Guidelines OR Specifications

Table 2

Selected keywords and field options in Omega (Utrecht University Library, 2011)

Abstracts	AND Abstracts	AND Any Location	AND Any Location
Curricul* ¹ OR Content OR Subject	Design OR Develop* OR Change OR Implementation OR Evaluat* OR Planning OR Improv* OR Restructur* OR Course OR Horizontal organisation OR Horizontal organization OR Reforms OR School improvement program* OR School restructuring OR Sequential approach OR Vertical organisation OR Vertical organization OR Standards OR Guidelines OR Specifications OR Mapping OR criteria OR coherence OR principles OR scope OR sequenc* OR clustering OR subject OR content	Higher education OR tertiary post-secondary postsecondary universit*	Curricul*

¹ * Refers to truncations

Data Selection and Analyses

At first, sampling units, “units that are distinguished for selective inclusion in an analysis” (Krippendorff, 2004, p. 98), were determined. By reading all titles and abstracts, potentially relevant publications were identified and screened for retrieval. This selection was based on a categorical distinction (membership in a class or category): hence, a potential relationship with curriculum classification principles, and the higher educational setting. In several situations it was not clear from the abstracts whether the publications were suitable for the inclusion criteria. Those publications were selected for the next phase as well. Second, the potentially relevant publications were studied, and evaluated in more detail to determine the presence of inclusion criteria. In addition to the curriculum classification and higher educational context, a third inclusion criteria was included: the presence of curriculum classification in the conclusion or discussion of the publication. Third, studies with relevant information were examined more in depth, by using recording/coding units, “units that are distinguished for separate description, transcription, recording, or coding” (Krippendorff, 2004, p. 99). Relevant phrases were marked within the publications, and then copied to a data extraction form. This form included indicators, such as: time when the study took place, geographical locations, study objectives, research methodology, descriptions of curriculum methods, models, standards, and challenges. Theory from Jackson (1992), Marsh and Colin (2008), Marsh and Willis (1995), Ornstein and Hunkins (2009), and Sawyer (2004) was used to classify the models (procedural, descriptive, conceptual, and critical approach, content- and process-driven) and methods (scope, continuity, sequence, integration, articulation, balance, horizontal and vertical organisation) more in depth. Fourth, prior unidentified, yet irrelevant publications were excluded from the final selection.

At that point, it seemed appropriate to review all previously obtained results. The aim was to increase the reliability, the accuracy, by repeating the procedure and counting the results. Moreover, with more knowledge and understanding of the research subject, it was easier to assess the relevance of the publications, and increase the validity. Thus, the selection procedure was repeated from scratch. In order to assess the quality of the publications, the presence of peer-reviewed publications was identified. Furthermore, the most frequently cited, the highest impact, and the largest journals in a field were categorised (Journal Citation Reports, 2011).

After the final selection of publications, the different indicators from the data extraction forms were combined. Within the publications, similarities have been identified and clustered in different categories. The sub-questions, and in the discussion section, the overall research question will be addressed. The results and research methodology will be discussed as well.

Results

In EBSCOhost® (2011), a total of 1379 abstract citations were obtained from the search strategy. In Omega (Utrecht University Library, 2011), a total of 1188 abstract citations were obtained from the search strategy. There was some overlap of publications being cited under more than one index, or reporting twice in different publications. After the elimination of duplicates, the abstracts of 1146 EBSCO-publications were included for the review. Within Omega, no duplicates were automatically eliminated. Closer examination of the abstracts resulted in the elimination of 1027 EBSCO- and 1136 Omega-publications, because they did not meet the inclusion criteria. Either they were related to special education, or they were *not* related to curriculum classification or higher education. The full-text versions of the remaining 119 EBSCO-publications and 52 Omega-publications were obtained and stored. Initially, 46 EBSCO-publications and nine Omega-publications seemed relevant, though 36 EBSCO-publications and five Omega-publications were rejected for the final phase. They did not report about curriculum classification in their conclusions or discussions, which has resulted in ten relevant EBSCO-publications and four Omega-publications. One publication was found in both databases, which resulted in 13 final publications. In the second search round, which started from the beginning with all abstract citations, one additional relevant publication from EBSCO was obtained. This review has been carried out with 14 publications.

All peer-reviewed publications were published in the twenty-first century and written in English. Most studies took place in North America (eight out of 14), two studies were conducted in Canada, two studies were conducted in The United Kingdom, one study took place in Germany, and one study took place in Iran. Most publications (eight out of 14) cover empirical case studies, the remaining four publications are critical theoretical analyses. One of the eight case studies and one of the four critical analyses do not report on curriculum methods or models, but mention only curriculum standards. Most authors did not mention a specific curriculum model they used. However, several parallels between their explanations, and curriculum models have been drawn. There is some overlap between the different curriculum models within a publication. Six studies are based on Tyler's rational-linear philosophy and the procedural approach, three studies show similarities with Dewey's philosophy, two studies correspond with the conceptual approach, one study shows similarities with the critical approach, and one study corresponds with the descriptive approach. Nine studies address a process-driven, and three studies a content-driven curriculum model. Ten studies report about integration, eight studies about scope, four studies about sequence, four studies about continuity, three studies about articulation, and one study about balance.

Categorisation Results

First, a brief categorisation about curriculum methods, based on the outcomes, is portrayed (see table 3). After that, the methods, their classification elements and underlying curriculum models will be discussed by publication. Most publications that report on curriculum classifications principles and procedures have not mentioned criteria to ensure the quality of the design process, though sometimes it is implicit in the method itself. Only a few challenges and difficulties will be identified.

Table 3

Categorisation Curriculum Methods by Author

Author	Categorisation
Amundsen, Weston and McAlpine (2008)	Concept mapping and course content
Bellingham (2008)	Guidelines
Brewer, Harriger and Mendonca (2006)	Curriculum development and approval process
Cuevas, Matvee and Miller (2010)	Curriculum mapping
Esmaily et al. (2008)	Course content
Evers and Wolstenholme (2007)	Curriculum development and approval process
Huang, Kohl and Galván (2010)	Course clustering and coherence
Jeske (2002)	Curriculum revision and approval process
Johansen (2007)	-
Knight (2001)	Curriculum coherence
Lovett, Jones and Stingley (2009)	Course content
McNertney and Ferrandino (2010)	Curriculum revision and approval process
Tractenberg, Umans and McCarter (2010)	Guidelines
Widrick, Mergen and Grant (2002)	-

Note. Johansen (2007) and Wildrick et al. (2002) have not described methods, only standards.

Curriculum Development/Revision and Approval Process

Four publications describe all aspects of a curriculum development or revision process, which includes proposals that need to be approved by a committee. Curriculum classification has occurred at different levels within the faculties. While Brewer, et al. (2006), Jeske (2002), and McNertney and Ferrandino (2010) report about curriculum development or revision at faculty level, Evers and Wolstenholme (2007) report about development activities of programme heads, course developers, and discipline experts. One publication, the critical analysis of Brewer et al. (2006), also reports about the involvement of internal and external stakeholders (people who are affected by the faculty), in order to identify market needs. *Standards* are identified by Widrick et al. (2002) who have measured three quality dimensions in higher education. *Difficulties and challenges* are addressed by Evers and Wolstenholme (2007), and Jeske (2002).

Curriculum and Concept Mapping

Two publications address the mapping method, a tool to reveal coherence and relationships: curriculum mapping (Cuevas et al., 2010) has occurred at faculty level, and concept mapping (Amundsen et al. 2008) has occurred at instructor level. Six *standards*, as well as *difficulties and challenges* for curriculum mapping have been identified by Cuevas et al. (2010).

Course Content

Three publications describe the course content selection procedures. Esmaily et al. (2008) report about the involvement of subject matter specialist outside the organisation. At faculty level, a research team, a panel of experts, content development experts, small teams of professionals have been concerned with course content development. Lovett et al. (2009) report about course content development at faculty level. They have involved experts outside the organisation and senior students in the development procedure. Within, the previous mentioned, Amundsen, et al. (2008), content development has occurred at faculty level. *Standards* for the selection of educational content in higher education have been identified by Johansen (2007). Amundsen et al. (2008) identify three relevant issues for the selection of course content. *Difficulties and challenges* for the use of a Delphi-process have been addressed by Esmaily et al. (2008).

Coherence

Huang et al. (2010) describe curriculum coherence at faculty level. In his critical analysis, Knight (2001) describes that course coherence and clustering occurs at the level of the instructor. The two instructors mentioned in his publication are also course developers. No *standards, difficulties or challenges* have been identified in the publications.

Guidelines

Tractenberg et al (2010) and Bellingham (2008) report about methods described in guidelines for course developers at the faculty level. No *standards* have been identified in the publications. Difficulties and challenges for universities that adapt benchmark statements have been addressed by Bellingham (2008).

Which Models and Methods can be identified?*Curriculum Development and Approval Process*

Evers and Wolstenholme (2007) describe a curriculum development process, which aims to integrate knowledge, skills, and values in every course at a newly created institution. Their development process starts with the programme heads, who line up expert course developers in order to prepare course proposals. “These proposals contain a course template and a detailed proposal, which in turn includes information on learning objectives, the course description, course topics, methods of instruction, online activities, a description of the evaluation methods, and a list of resources needed for the course” (Evers & Wolstenholme, 2007, p. 84). After the completion of the course proposals, a curriculum development committee reviews them, followed by an institutional approval process. Since the aim for each course is to integrate theory with practice, courses are described in terms of knowledge, skills and values. While course developers identify general skills and values, knowledge descriptions are primarily left to disciplinary experts. Then, course developers need to consider which of the skills and values are most relevant for each course, and how skill and value development may be achieved. To ensure the coverage of all skills and values in learning objectives, and identify potential gaps in the programme, the next phase entails the development of a matrix. This verification is relevant for programme leaders, in order to decide whether this is a problem and, if that is the case, whether these skills are better assigned to upper-level courses.

Evers and Wolstenholme’s (2007) method portrays design considerations about *integration* and *articulation*: knowledge, skills, values, theory and practice are integrated in every course. The matrix illustrates design considerations about *scope*, *sequence*, and *continuity*. The presence of the proposals (plans in order to achieve goals) corresponds with Tyler’s Rational-Linear, and the procedural approach. It also corresponds with the process-driven curriculum model, since the course content is only an element in the process, and not the primary source of concern.

Brewer et al.’s (2006) critical analysis of a curriculum development model, has resulted in recommendations for building a functional, effective and dynamic curriculum. They suggest a continuous improvement process framework for the development of a comprehensive curriculum, which consists of four phases at faculty level. At first, the data collection phase incorporates the investigation of curricular standards, in order to reveal the market needs, and to understand the technical and educational environment of the curriculum. The market needs can be identified through a stakeholders analysis among students, potential employees, educators, administrators, citizens, and accrediting bodies. Second, the evaluation phase identifies and evaluates essential competencies for the programme, its goals, and current course documents. Third, the design phase refers to an iterative process about the way the curriculum is constructed or has been changed, and it identifies the relationship with the mission, needs, resources and other factors. Each course model needs to demonstrate the direct association between course outcomes and programme objectives. Within this

phase, four curricular approaches are suggested: the programme can start with either practicum, theory, breadth, or depth. The main result of the design phase is a thorough communication plan for all stakeholders. Fourth, the implement phase refers to the review of the proposals, and the development of detailed curriculum documents, in which the current course information and the proposed changes are listed. Finally, the submitted proposals are implemented.

Brewer et al.'s (2006) method portrays design considerations about *scope* and *sequence*: which is reflected in the practicum versus theory, and breadth versus depth approaches. Associations with course outcomes, programme objectives, the mission, needs, resources, and other factors address considerations about *integration*. The presence of the different phases (data collection, evaluation, design, implementation) in order to achieve goals, corresponds with Tyler's Rational-Linear, and the procedural approach. Due to the extensive stakeholders analysis at the beginning, the curriculum development seems to correspond with the content-driven curriculum model. Nevertheless, since content is not the primary source of concern, and explicit attention has been paid to the process and the necessary steps to follow, it corresponds more with the process-driven curriculum model.

Curriculum Revision and Approval Process

Jeske (2002) describes a curriculum development revision process, which aims to develop strong courses. At first, the larger curriculum is connected to the main academic objectives on a course-by-course basis. At faculty level, the discussion, revision, and approval of essential course elements, namely a set of key principles (student-centred learning, challenges to engage in creative and critical thinking, cultural and global perspectives, values and ethical dimensions of knowledge, and a focus on practical applications), takes place. For the coherence of the curriculum, every course needs to include as many principles as possible. The second step entails the development of clear and concrete criteria for each general education requirement. This will be explained under the *criteria section* of this report. The third step involves the rigorous screening of course proposals by subcommittees and an overall curriculum committee. Each proposal needs to demonstrate the systematic inclusion of the set of criteria. Fourth, course evaluation take place with a newly developed course assessment form. The fifth step involves the creation of a feedback loop in which assessment data strengthens individual courses as well as the overall general education requirement. By developing such a mechanism, revision processes may be more structured in the future.

Jeske's (2002) method portrays design considerations about *integration*: principles are included in the courses, and the feedback loop integrates assessment, courses and education requirements. The curriculum revision focuses more on the development process, rather than the contribution on course content. Therefore, it corresponds with the process-driven curriculum model. The presence of structured steps to follow in order to achieve goals, corresponds with Tyler's Rational-Linear, and the procedural approach. In addition, Dewey's philosophy of experience and education (Sawyer, 2004) addresses the faculty's principles.

McNertney and Ferrandino (2010) describe a course vetting process during a curriculum revision, which requires that each course must be vetted by the faculty senate to become part of the core curriculum. Elements to consider in a curriculum revision process are the integration with the university's mission statement, a broadly participatory process by faculty members, and the incorporation of student-learning outcomes. McNertney and Ferrandino (2010) explain activities in order to achieve desired competencies and learning outcomes within various courses. During the process, the submission forms that are based on initial submissions and comments are devised, field-tested, and revised. While the structure of the vetting process is important, the methods used by committees in order to vet courses and to communicate the decisions to those submitting the courses are even more fundamental. The next step entails a careful consideration whether to reject or accept the submissions. Their curriculum has resulted in a mixture of five general education models. It has elements of a distribution model because it requires courses in various traditional categories. It has elements of a core curriculum model due to a predetermined set of skills and knowledge in the essential competencies from a common set of courses. It has elements of a common intellectual experience, because there were specified outcomes for each category. It is thematic because several course categories are structured around themes. Finally, the presence of upper-level requirements courses relates to junior or senior course levels.

McNertney and Ferrandino's (2010) method portrays design considerations about *integration*: different types of knowledge and experiences have been linked to the curriculum plan. The different course levels portray design considerations about *continuity*. The presence of the submission forms (plans in order to achieve goals) corresponds with Tyler's Rational-Linear, and the procedural approach. It also corresponds with the process-driven curriculum model, since the course content has been subordinate to the overall process.

Curriculum Mapping

Cuevas et al. (2010) report on programme curriculum mapping: a practical tool, utilised by various departments at a university. Through the lens of intentionality and transparency, the model reveals the curriculum coherence between and among essential curriculum components: the intended outcomes, courses, syllabi, instructional activities, and assessment of learning. While intentionality is defined as "the deliberate and systematic alignment of desired programme learning outcomes with course-level outcomes and instructional and learning activities" (Cuevas et al., 2010, p. 11, curriculum transparency focuses on the clarification of course syllabi and the development of programme maps. The curriculum map represents the design and sequence of courses in the context of programme outcomes and general educational competencies in the form of a two-dimensional matrix. The matrix illustrates core competencies, and programme courses. Furthermore, the matrix exposes the following three elements: competence levels (introduced, emphasised, reinforced, and advanced), explicit or

implicit outcome statements that are reflected in the course syllabus, and the presence of feedback on students.

Cuevas et al.'s (2010) method portrays design considerations about *scope*: this has been reflected in the course and competency levels. By identifying the competencies within all courses, design considerations about *continuity* have been showed. *Sequence, integration, articulation, and balance* have been represented due to the structure of the matrix: it reveals the coherence of the curriculum elements. The curriculum map has been developed to create curriculum awareness among the faculty; it puts more emphasis on the interaction between different courses, rather than the contribution on individual courses. Therefore, it corresponds with the process-, instead of the content-driven curriculum model. Furthermore, due to the rational steps to follow, this method corresponds with Tyler's Rational-Linear, and the procedural approach.

Concept Mapping and Course Content

According to Amundsen et al. (2008), the understanding of subject matters is the primary point of reference in instructional decisions. They have described concept mapping as a valuable method in the first step of a course design process. Concept mapping is a way to rethink course content (by instructors); it reveals relationships among, and the integration of concepts. Previously concept mapping procedures have been applied by Donald (as cited in Amundsen et al., 2008) in a broader context: to compare various course structures in a university. Amundsen et al. (2008) identify twelve emergent themes, divided in four categories, during the concept mapping process. In the first category, *the conceptualisation of the course content*, (1) course concepts are reconsidered and clarified, (2) the relationships of course concepts in maps are changed and simplifies, (3) the relative importance of course concepts are adjusted, (4) aspects of the (previously separated) course are brought together. In the second category, *other course components*, (5) false assumptions about students' prior knowledge are identified, (6) other course aspects are linked to new course conceptualisations, (7) possible ways of using the concept map with students are described, (8) other uses of concept mapping are identified. The third category, *the concept mapping process*, (9) is to think about, and engage in the process itself, (10) the impact of group interaction is outlined, (11) benefits of and problems with concept mapping are identified. The fourth category, *disciplinary knowledge and design and the representation of the course*, (12) outlines the theoretical and professional practice to the course design.

Amundsen et al.'s (2008) method portrays design considerations about *scope* and *balance*: this has been reflected in the first category, the conceptualisation of the course content. Considerations about *integration* are reflected in all categories. Even though there are some vertical organisation elements within the courses, the concept mapping process emphasises the horizontal organisation. Amundsen et al.'s (2008) concept mapping process, has not been based on an entire curriculum. Nevertheless, it reveals a relationship with content-driven curriculum models, because the selection of content is considered as a key element. It does not seem to relate to the procedural approach

(outcomes-based), rather it corresponds with the conceptual approach (what are the elements of curriculum planning and how do they relate?). Furthermore, concept mapping has been based on the assimilation theory of learning (Ausubel, Novak, and Hanesian; in Amundsen et al., 2008), which represents a cognitive view of learning: individuals learn by organising, relating and integrating new concepts into their existing cognitive structures.

Curriculum Coherence

In his critical analysis, Knight (2001) identifies curriculum coherence as an essential element within institutions of higher education. Three elements are essential for coherence: (1) planned actions should be created and creations must be understood, (2) curriculum content, organisation, learning and teaching strategies, and assessment arrangements should dovetail with each other, and (3) key messages that encompass learning encounters, should constitute an intentional discourse about relevant matters and the *rules of the game*. Knight (2001) claims that higher education is concerned with complex learning, because it features indeterminate, contingent, and non-linear elements. Indeterminately refers to predictions that cannot be made exactly, contingency entails that it depends on something that may happen in the future, and non-linearity refers to relatively small changes that can produce dramatically different outcomes. Within this view, an approach to coherence needs to break with discourses of learning outcomes, rational curriculum planning, linear, simple systems. Instead, the complexity of learning is considered as a starting point for coherence. Therefore, this process approach starts with the identification of good learning, teaching, and assessment within specific subject areas, and results in programme-wide teaching and learning standards. Coherence may be accomplished by taking each module and choose compatible encounters with the material. The following step includes the distribution of these encounters against the set of modules that make the programme, or that part of it within a team or department's control. According to this approach, progression takes place when the team is clear about the available scaffolding for beginning students, and the way it is dismantled when students move through the programme.

Knight's (2001) method portrays design considerations about *integration*: this has been reflected in the coherence aspects, and the linkage of experiences within the curriculum. This process-driven curriculum model also corresponds with the conceptual and critical approach, since it focuses less on planning procedures and more on students' interests. The method invites teams to act in a natural way, by planning in response to real behaviour of teachers and students, by considering how to remove scaffolding, and by then using appropriate means for the purposes of judging achievements. This corresponds with Dewey's philosophy of experience and education (Ornstein & Hunkins, 2009).

Course Clustering and Coherence

Huang et al. (2010) report about an experimental course clustering procedure, which aims to bring coherence between several courses. The procedure entails the modification from serial to parallel in

course sequencing: two courses that used to be sequential and dependent, are offered at the same time to the same students. In order to solidify the just-in-time, learn-and-apply process, a third course may be included as part of the course clustering. A topics breakdown schedule ensures that timing issues, such as adequate time gaps between key concepts in the different courses, are addressed. The implementation of a common integrated project, instead of individual projects for each course, may increase students' learning effect. An essential ingredient for course clustering is the alignment between instructors, and their course programmes. In order to accomplish feasibility, this procedure requires that instructors meet on a regular basis, review topics and coordinate timing issues. For the assurance of coherency and synchronisation, an instructional plan is necessary. Where appropriate, the course instructors, who are course developers as well, explain the relationship between basic concepts of each other's courses.

Huang et al.'s (2010) method portrays design considerations about *sequence*, *continuity*, *integration*, and *articulation*: respectively the serial and parallel sequence, the vertical repetition of components in their project, the presence of a course cluster and the link between various types of knowledge, the horizontal and vertical interrelatedness. The course clustering strategy emphasises the process, rather than the content, and therefore corresponds with the process-driven curriculum model. The process has not been based on an entire curriculum, though it shows similarities with the descriptive curriculum approach, since it explains the actions of the designers.

Course Content

For the identification of outcomes-based indicators, and the development of curricular content, experts' consensus via a Delphi process has been described as the fundamental element (Esmaily et al., 2008). The first step in the Delphi process is to send a questionnaire with (16) potential learning outcomes and indicators to subject matter specialists, who can decide whether there is a need to include the learning outcomes in a course programme. A research team assesses the returned questionnaires, and develops a second questionnaire with the initial potential learning outcomes from the first round, expanded with several new learning outcomes as suggested by the experts. In this second questionnaire, participants determine which of the proposed outcomes should be included. A specially assigned panel of experts reviews the results of the second stage of the Delphi process, and tries to reach consensus on the final educational outcomes and indicators. The next step in the process entails the identification of a team of experts for the content development. In the third phase, the team responsible for content development divides the learning outcomes into several main areas for the curriculum. Small teams of professionals who are experts in each topic, develop (per team) the content for each of these areas. One week prior to the final review meeting, the distribution of the results from each small group to all the other teams takes place. In order to reach consensus during the final meeting, a discussion about the curricular content, and a revision of some of the topics takes place.

Esmaily et al.'s (2008) method portrays design considerations about *scope*: the identification and selection of relevant course content. Their method has not been based on an entire curriculum, though, it reveals a relationship with content-driven curriculum models, since the selection of content has been considered as a key element.

Lovett et al. (2009) describe a *Quickulum* process for quick response curriculum verification in order to adjust workplace trends within course content. The first step entails the selection of a purposive sample, based on relevant and successful organisations in the work field. In order to increase the response (with the full schedules of the work field managers in mind), a short and user friendly one-page questionnaire about course contents, with the header *Quick 5 Minute Survey*, is distributed. At the same time, the distribution of an identical questionnaire among senior level students, in order to compare the various perceptions, takes place. The next step involves the selection of course content that receives the most weight in importance. New suggestions (compared to the current course content) from the work field are field-tested on students to assess their current awareness, and to ensure the necessity of the topics. As a positive side effect, managers may feel satisfied because they have been asked for input. Due to this benefit, the *Quickulum* process, as described in Lovett et al. (2009), has been completed with an additional face-to-face discussion between the faculty and some work field managers.

Lovett et al.'s (2009) method portrays design considerations about *scope*: the identification and selection of relevant course content. Their method has not been based on an entire curriculum. Nevertheless, it reveals a relationship with content-driven curriculum models, because the selection of content has been considered as a key element. Furthermore, it corresponds with the process-driven model. The path to determine the content, has been considered quite relevant as well: special attention has been paid to involve the work field managers.

Guidelines

Tractenberg et al. (2010) report about a mastery rubric: a guide for curriculum and assessment design in order to provide enough structure for course developers to create content and assessment. This rubric reflects on specific instructional outcomes that go beyond a summary of learning objectives. The first step entails the selection of key skills that represent a general framework for a specific subject field, and ignores content- or domain-specific skills. The selection is based on the developer's personal experience, in combination with the examination of official manuals from the work field (in their particular situation: APA-manuals). For flexibility in the curriculum, the creation of performance-level descriptions is required for each skill. From there on, the curriculum design proceeds and course topics are identified. Guided by key features of assessment, the curriculum can be formalised. These features depict on desired knowledge, skills, ability outcomes, their belonging actions (behaviours) and tasks. The rubric provides a unifying structure for the various courses, based on overall learning goals.

Tractenberg et al.'s (2010) mastery rubric portrays design considerations about *integration*: linking various types of knowledge and experiences to each other. The process has resulted in the determination of the breadth and depth of the content, its *scope*. Unintentionally, the features correspond with Tyler's Rational-Linear, and the procedural approach. It also corresponds with the process-driven curriculum model, since the course content is subordinate to the overall process.

Slightly different compared to previously mentioned methods, is the presence of documents, formulated by organisations outside the faculty. Subject benchmark statements are documents published by the Quality Assurance Agency for Higher Education (Bellingham, 2008). Higher education institutions are expected to consult these statements when they design, deliver, and review programmes. Usually, statements include the description of principles (subject areas), (2) the subject's nature and extent, such as the boundaries of a discipline and its relationship with cognate areas, (3) knowledge, understanding and skills, (4) teaching learning and assessment methods, and (5) benchmark standards, the minimum performance.

Bellingham's (2008) benchmark statements portray design considerations about *integration*: the relationship with cognate areas. The process has resulted in the determination of the breadth and depth of the content, its *scope*. The benchmark statements correspond with Tyler's Rational-Linear, and the procedural approach. It also corresponds with the process-driven curriculum model, since the course content has been subordinate to the overall process.

Which Standards can be identified?

Curriculum Development

In their case study, Widrick et al. (2002) measure three quality dimensions in higher education: the quality of design, conformance, and performance. They discuss these measurement parameters in order to evaluate the quality of research, a curriculum development process, and the required tools and techniques for the evaluation. The *quality of design* refers to the degree that the design captures the consumers' requirements, and is based on three factors. "First, the quality of the insights gained about the consumer and the depth of understanding of their requirements. Second, the quality of the process used to translate these consumer insights and requirements into a product or service that provided value to the consumer. Third, the continuous improvement of the design process" (Widrick et al., 2002, p. 124). Measurement parameters for the quality of design are: market needs, the manufacturing of knowledge and skill requirements, emerging educational training programmes, knowledge and skills requirements and the module content. Measurement tools for these parameters are, for example, focus groups, interviews, and surveys. The *quality of conformance* refers to the degree that design requirements are satisfying in terms of uniformity, dependability and cost requirements. Quality of conformance is determined by the minimisation of variance from design requirements for the goods and/or services. Thus, for each design specification a proper measure has been developed in order to

make sure that design requirements are met. Measurement parameters for the quality of conformance are: programme designs, course sequence, and course content. Measurement tools for these parameters are, for example, reviews, feedback, and check sheets. The *quality of performance* refers to the degree that a service or product performs in the eyes of the end-user or consumer (both internal and external). Measurement parameters for the quality of performance are: programme design, and course content. Measurement tools for these parameters are, for example, reviews, analyses, and post-satisfaction surveys.

Curriculum Mapping

Cuevas et al. (2010) identify six criteria for curriculum mapping. The clear articulation of intended general education core competencies, multiple learning opportunities for students in order to develop general education core competences, the sequence of courses in the developmental pattern to facilitate student achievement of general education core competencies, opportunities to integrate multiple core competencies within individual courses, the presence of students' feedback on their progress in mastering core competencies, and the quality of the communication to students about general core competencies in course syllabi.

Course Clustering and Coherence

Huang et al. (2010) identify three criteria for their course clustering strategy: compatibility, feasibility and accessibility. Compatibility requires that learning objectives for courses concerned are generally compatible. The feasibility criteria refers to the possibility of arranging all relevant topics in order to ensure a proper course sequence. This has been considered as a key concern and a necessary condition for course clustering. Accessibility has to do with students' access to the courses, which addresses the student audience involved. Even though, it is not absolutely necessary, the effectiveness of relational/contextual learning and logistical issues may increase if courses are taken by the same group of students.

Course Content

Amundsen et al. (2008) identify three relevant issues for the selection of course content. They put strong emphasis on the role of the instructor: his or her personal understanding of the course content is considered as a starting point for all other course design elements. The second relevant issue concerns the relationship between the course content and statements about students' learning goals. Amundsen et al. (2008) have not explained this relationship in their publication. Third, the structure of knowledge should not be taken for granted; it can be clarified by using concept mapping.

Johansen (2007) formulates several standards for the selection of educational content in higher education. He makes a distinction between the educational subject (teaching a subject) and its underlying basic subject (knowledge about the discipline). The educational subject is constituted in a

*didaktik*² triangle, which illustrates the relationship between the teacher, the content, and the student. For the selection of educational content, he proposes five standards. These standards highlight how answers must relate to a particular level within particular educational subjects and in relation to particular academic staff and students. 1. *The content should contain exemplary values.* This concerns the core content, larger areas of a discipline, connections to other subject areas, and to their futures outside education. 2. *The content should have significant relations to students' backgrounds.* An element of students' lives, their conceptions of themselves and to the world, and their areas of competence should be included. 3. *The content should be significant for students' futures.* This refers to the selection based on the potential to play a vital role in students' future professional lives. 4. *The elements, layers, contexts and results criteria of the content should be structured.* This concerns individual elements of the content as a meaningful whole, their relationships, the extent that layers of the content can be understood in relative independence of each other, the wider context of the content, awareness of peculiarities, identification of the body of knowledge. 5. *The special sides of any content that can make its structure approachable for our students should be noted.* Identification of special cases, phenomena, situations, experiments, persons, elements that make the structure of the content interesting, stimulating, approachable, conceivable or vivid for students on a particular level.

Which Challenges and Difficulties can be identified?

Curriculum Revision and Approval Process

During the general education reform process, a key lesson has been the importance of redefining the relationship of individual faculty members to the college or university and its goals and values. At the individual course level that relationship is predominantly expressed. In determining the success of students' academic experience, all individual courses are considered measurably more important than the general education model. The first year's discussion resulted in failure, because the task force has been too innovative and far ahead of the faculty with their proposed innovations. The faculty has not embraced a fusion of separate general education requirements into one study programme. The conflict over this and other far-reaching proposals has resulted in profound disagreements about the extent of the reform (Jeske, 2002).

Curriculum Development and Approval Process

Even though there is a considerable amount of administrative and cultural hurdles during the curriculum development process, the experience has been considered valuable for the faculty. The programme requires a lot of time, patience, and support. Most of the difficulties are related to the

² German term

curriculum committees, and their approval of the nature and aims for the curriculum. For example, different committees are assigned to approve the applied nature versus the substantive content in experiential learning. Approval of the proposals has been accomplished by justifying the content, and answering all questions at committee meetings (Evers & Wolstenholme, 2007).

Curriculum Mapping

The development of a curriculum mapping model has resulted in a broad variety of reactions. Due to the fact that most faculty members have no experience with curriculum mapping, they feel frustrated and do not accept its potential value in examining the programme's coherence. During the implementation of curriculum mapping, it is essential to invest sufficient time and effort in the structure, analysis, and periodic map reviews. The use of labels in order to describe content delivery levels, and develop a comprehensible data collection tool (curriculum matrix), is relevant for building consensus in the various disciplines. Further, it is essential to create a climate of collegiality, flexibility, autonomy, and transparency for a successful implementation of the complex curriculum mapping process (Cuevas et al., 2010).

Course Content

By using a Delphi technique for course content development, the aim is to distil experts' opinions, and reach consensus among heterogenic groups without geographical constraints (Esmaily, et al., 2008). A complication of the Delphi technique is a certain amount of non-response to the questionnaires. Furthermore, a comparison between the outcomes and the final curricular course content reveals a discrepancy. While all outcomes of the Delphi process are covered in the course, the entire course entails non-mentioned outcomes as well. The first explanation is that, despite receiving a finalised outcome-list and an explanation about how they are obtained, tradition has prevailed. A review of the topics included shows that the development team teaches these topics in other courses. The other more plausible explanation can be found in the description of the instructions during the Delphi process. While experts are assigned to select relevant course content, the need to link outcomes to course content, is not discussed explicitly. Another concern is the quality of the outcomes and their indicators: one word seems hard to measure without clear guidelines.

Guidelines

Bellingham (2008) identifies several challenges for universities that adapt benchmark statements. Universities consider the benchmark statements unacceptable bureaucratic, and become dissatisfied, due to the lack of reflection and discussion options within the statements. Furthermore, a period of five years before the statements' revision, seems too long to ensure an accurate reflection of the discipline. They also find it challenging to select the appropriate combination of statements for multi- or interdisciplinary programmes, and to combine these statements with other requirements.

Discussion

A limitation of this research is that not all publications are highly ranked in citation indexes. That does not imply that the quality of these publications is disputable, though it is something to keep in mind. Another limitation is the author's view on classification principles and procedures: other authors may have other interpretations about these elements. Therefore, by explaining all considerations, and providing insight into the author's reasoning, this can be tackled. Since the aim of this review study is to give guidance in curriculum design, faculties in higher education can adapt elements for their own designs. Curriculum design, as described in the introduction of this report cannot be separated from curriculum development, results show that they are interconnected. The main question of this review study is: *Which curriculum classification principles and procedures for institutions in higher education can be identified?* This resulted in content-, approval-, and mapping-related principles and procedures, which will be explained below. They can be used in addition to each other, or separately. The categorisation reveals considerations for curriculum design processes.

Content Classifications

Content-driven curriculum models put all emphasis on subjects and the content (Amundsen et al., 2008; Esmaily et al., 2008; Lovett et al., 2009). When curriculum designers choose a content-driven approach, they can select *curricular* content at faculty level, at the beginning of the design process. By using a Delphi-method, experts within (a research team, a panel of experts, content development experts, small teams of professionals) and outside (subject matter specialists) the organisation can engage. The Delphi-method addresses the scope design consideration, and can be accomplished in the following way: send a questionnaire to subject matter specialists, assess the returned questionnaires, develop a second questionnaire, review the results and try to reach consensus on the final educational outcomes and indicators, identify a team of experts for the content development, divide the learning outcomes into several main areas, develop curricular content, and discuss results (Esmaily et al., 2008). Input from other stakeholders, such as students, potential employees, educators, administrators, citizens, and accrediting bodies, can be collected as well (design phase in Brewer et al., 2006).

Even though the curriculum development process of Brewer et al. (2006) has been categorised as process-driven, their first phase corresponds more with a content-driven curriculum model. Their curriculum development framework shows that the identification of curriculum models within publications is complicated. Not only is the identification based on limited and selected information of the authors, the distinction between curriculum models is sometimes difficult to capture. For instance, if a curriculum design or development process is more widespread than Tyler's Rational-Linear and the procedural approach, it still does not correspond with a descriptive, conceptual or critical approach, which is the case within the publication of Brewer et al. (2006). For this review study, it shows that curriculum models are not always grounded in curriculum design and development

processes. A second explanation lies in the lack of appropriate curriculum theories, as mentioned in Marsh and Willis (1995).

Another option is the selection of *course* content by faculty members or instructors at a later phase in the design process. By sending a short and user friendly one-page questionnaire (*Quickulum* procedure) to successful organisations in the work field, course content can be verified and updated. The same questionnaire can be sent to senior students, in order to verify their expectations. The next steps involve the selection of highly rated and newly suggested course content, field-tests, and the update of course content (Lovett et al., 2009). By using a concept map, the translation of the content into the educational setting will be accomplished. Concept mapping is a way to rethink course content (by instructors); it reveals relationships among, and the integration of concepts. Four categories are included in the concept mapping procedure: the conceptualisation of the course content, relationship with other course components, the concept mapping process, and disciplinary knowledge, design and the representation of the course (Amundsen et al., 2008).

When curricular content is the starting point of the curriculum design, there are several standards to keep in mind. The content should contain exemplary values. The content should have significant relations to students' backgrounds. The content should be significant for students' futures. The elements, layers, contexts and results criteria of the content should be structured. The special sides of any content that can make its structure accessible for our students should be noted (Johansen, 2007). Esmaily et al. (2008) have learned from this Delphi-method to be very explicit in their explanation, and to be aware of prevailing traditions. Other concerns they have not mentioned, address the intensity and extension of the process. A vast amount of people, time, money, and other resources is required. An alternative for the complex Delphi-method, is the *Quickulum* procedure, though, the latter method might be less valid and reliable. In essence, there is no communication about the results between faculty and field experts, and it is a *one-moment* activity. However, it can create interaction between faculty members and field experts after the official procedure, and is therefore functional. Furthermore, the value of the *Quickulum* procedure might increase with additional field-tests and measurements of students' perception on the new curriculum. Amundsen et al. (2008) put great emphasis on the instructor's understanding of the course content. For their research, with academic subject matter specialists (no novice teachers), this appears to be a logical assumption. However, for the generalisation of their findings, related to the research questions in this report, it creates several complications. By using the instructor's knowledge as a central starting point, the course content may depend too much on the knowledge of these individuals. Therefore, it might be better to select a team of experts, who can share their knowledge during the selection of course contents.

Approval Classifications

While the content-driven procedure relies on consensus and mutual understanding within the faculty, results from the curriculum development and revision processes show a more top-down approval process. Special committees are assigned to approve proposals. Evers and Wolstenholme's (2007) procedure starts with programme heads who line up course developers in order to prepare course proposals. After the completion of the proposals, a curriculum development team reviews the proposal. In the end, the institutional approval is required. Brewer et al.'s (2006) procedure starts with a data collection and evaluation phase. The next phase, the design phase, addresses the development of course models. The last phase, the implementation phase, involves the review and approval of the selected course documents. Jeske's (2002) procedure starts with the identification of university principles (general education requirements), and the description of clear and concrete criteria for those principles. The next steps involve the rigorous screening, assessment and approval of course proposals by subcommittees and an overall curriculum committee. McNertney and Ferrandino's (2010) course vetting procedure starts with the description of goals and requirements for their curricular reform process. The next step involves the creation, field-testing and revision of submission forms. The last step entails the vetting of courses by the faculty. Thus, all approval processes concern course developments, and proposals must be approved at faculty level. The content of the proposals corresponds with the view of Marsh and Willis (1995): instructional design and curriculum development cannot be separated from each other. However, according to Seel and Dijkstra (2004), they are not closely related, due to their separate literature, argumentation lines, and knowledge bases. Perhaps, that is something to reconsider, and at least guarantees that instructional design is fully-grounded within the curriculum development. This might lead to a more broad and complete learning experience.

For the overall development process, three standards can be considered (Widrick et al., 2002): the quality of design, conformance, and performance. The quality of design refers to the extent to which the design captures the consumer's requirements. Especially for the design phase of Brewer et al. (2006), this is valuable. The quality of conformance refers to how well the design requirements are satisfying, including the uniformity, dependability and cost requirements. This is valuable for all proposals. The quality of performance refers to how well a service or product performs in the eyes of the end-user or consumer. While this is valuable for all proposals after the implementation, it is not related to the publications on approval procedures. Nevertheless, this should be considered by faculties during the overall development process. It seems peculiar to assess students' performances, and at the same time overlook curricular performances. In terms of difficulties, approval processes can be challenging for those involved. It requires a lot of time, patience and support. Expectations between developers and committees are not always compatible, and faculties have to deal with administrative and sometimes cultural hurdles (Jeske, 2002; Evers & Wolstenholme, 2007). By taking that into consideration, the measure of control within proposal procedures can lead to more coherence within

faculties, though in order to be successful, proposal procedures require capable and objective committee members. Expectations about proposals must be explained in detail by representatives of the committees. Coherence can be further ensured by using a matrix which covers all skills, values, learning objectives, and identifies potential gaps (Evers & Wolstenholme, 2007).

Mapping Classification

Curriculum coherence can be accomplished, based on various approaches of curriculum development or design. According to Knight (2001), a process-driven curriculum approach that breaks with discourses of learning outcomes and rational curriculum planning, is feasible. This corresponds with conceptual and critical approaches, and Dewey's philosophy of experience and education (Ornstein & Hunkins, 2009). At first, programme-wide teaching and learning standards, based on the identification of good learning, teaching, and assessment within specific subject areas, should be developed. The next step involves the selection of compatible encounters with the material, for each module. The following step entails the distribution of these encounters against the set of modules that make the programme, or that part of it within a department or team's control. According to this approach, progression takes place when the team is clear about the available scaffolding for beginning students, and the way it is dismantled when students move through the programme. Even though Knight's (2001) assumptions may be more realistic than rigid curriculum approaches, it raises concerns as well. Results from the overall procedure offer less guidance to instructors and students, and there is a lack of quality insurances. And from a practical point of view, one should wonder whether his approach is feasible at large institutions.

Besides this loosely-structured method, more structured mapping and clustering strategies can be identified for coherence. A curriculum map represents the design and sequence of courses in the context of programme outcomes and general education competencies in the form of a 2-dimensional matrix. The matrix reveals: core competencies, programme courses, competence levels, explicit or implicit outcome statements reflected in course syllabi, and the presence of feedback on students (Cuevas et al., 2010). By using a curriculum map, all design considerations (scope, continuity, sequence, integration, articulation, and balance) are addressed. Besides the mapping procedure on curriculum level, coherence can also be accomplished with a course clustering strategy on programme (module) level (Huang et al., 2010). This strategy provides opportunities to change course sequences from serial to parallel. A topics breakdown schedule to address timing issues, and intensive contact between course instructors, are essential ingredients for success. In addition, an integrated project can be developed as well. Next to mapping and clustering procedures on curriculum and module level, concept mapping at course level can be applied (Amundsen et al., 2008). This method to rethink course content, by instructors, has been categorised under content principles and procedures as well. The experimental course clustering strategy of Huang et al. (2010) identifies three standards: compatibility, feasibility and accessibility. The strategy itself is not described in detail and it does not

explain how the courses are selected. Furthermore, the clustering depends entirely on the capacities of two instructors, which can be seen as a weakness in the programme. It might be better to develop the course on a faculty level, since there is no integration with other curriculum elements. They do not describe any problems during the process. Therefore, their publication appears to be useful for a better understanding of curriculum classification principles, but is limited as well.

Curriculum mapping standards are related to a clear articulation of core competencies, multiple learning opportunities, course sequencing, opportunities to integrate core competencies within individual courses, the presence of feedback, and the quality of the communication. The curriculum mapping process is intensive and time consuming. It is essential to create a climate of collegiality, autonomy, flexibility, and transparency, in order to implement the complex processes of curriculum mapping successfully (Cuevas et al., 2010). Even though several curriculum mapping standards are identified, they may be not too specific enough. Therefore some final recommendations. By using proper operationalisation, such as described within the concept mapping (Amundsen et al., 2008), it may be easier to make decisions during the process. The use of guidelines may ensure enough structure for course developers to create content and assessment (mastery rubric in Tracktenberg et al., 2010). For example, performance-level descriptions for each skill can create guidance. Based on the lessons learned from benchmark statements (Bellingham, 2008), designers should be involved within the development of guidelines. Otherwise they may feel dissatisfied, due to the lack of reflection and discussion options. It is also relevant for the validation of the guidelines. Whereas Tracktenberg et al. (2010) strongly rely on their own experience, the input from colleagues may improve the guidelines. Further, it is relevant to update the guidelines in time, to ensure an accurate reflection of the discipline.

Conclusion

Three curriculum classification principles and procedures for institutions of higher education are identified in this review study. Content classification puts emphasis on the identification, conceptualisation, and structuring of subject matters or content. Within the top-down approval classification, special committees are assigned to approve course proposals. Mapping classification can be divided in loosely-structured methods, or more structured mapping and clustering strategies, in order to identify the coherence within a curriculum. These classification principles and procedures can be used in addition to each other, or separately. The three-dimensional categorisation in this study reveals considerations for curriculum design processes.

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