Mapping in the Postgraduate Syllabus of Chemical Sciences: Vision NEP-2020

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Abstract

Curriculum mapping is a crucial process in education, aiming to align resources, activities, assessments, instruction, and educational reforms with a program. It helps identify and rectify gaps, redundancies, and misalignment in course content, improving the overall coherence and effectiveness of a course. A good curriculum considers student abilities, goals, institution expectations, course materials, and time duration. This paper highlights the importance of curriculum mapping for the effective implementation of NEP 2020 in chemical sciences.

Keywords: NEP 2020, curriculum mapping, higher education, chemical sciences

Introduction

In education, a course of study is designed to deliver subject knowledge to learners effectively. An educator's objective is to impart the prescribed curriculum to help learners understand and retain the information. However, the best results are usually seen in courses wherein the curriculum is constantly revised. Along with the duration of the study, observing the teaching and learning process can help teachers identify the areas of improvement in a curriculum. And working on these areas of improvement can improve the quality of education being given in a course over time. A popular method of evolving a course curriculum is curriculum mapping.

Curriculum mapping is the process of aligning resources, activities, assessments, instruction, and educational reforms with a programme. It is defined as indexing or diagramming a curriculum to detect and rectify the gaps, redundancies, and misalignment in the course content. This exercise helps in improving the overall coherence of a course of study and its effectiveness. The objective of a curriculum is to organise the teaching effort for a subject and enable students to enhance their knowledge as per the required level and their aspirations. A good curriculum is designed considering student abilities and goals, the expectations of an institution's administration, course materials being used, and time duration. The present paper describes the need of curriculum mapping for the effective implementation of NEP 2020 in chemical sciences.

Curriculum Highlights

General Characteristics of a good curriculum

- In general good curriculum consists of following features

- Well-organized and Purposefully Designed for Effective Learning
- Alignment With Lessons, Courses, Subject Areas, and Grade Levels
- No Repetitions of Concepts and Content
- Defined Objectives and Outcomes
- No Academic Gaps
- Alignment With the Latest Reforms Such as NEP 2020

Methodology

1. Building an Organised Path: Curriculum mapping is essentially creating a road map that teachers and students must follow during the course. Curriculum mapping defines the starting and the endpoint of the course and the various milestones that students must achieve on the way. In the present work the experience of authors during teaching at graduate and postgraduate level in chemical science have been opted as tool to identify the path.

2. Alignment with Standards: Every educational institution has some predetermined standards to live up to. Their affiliation to a university or a government education department may define the standard of education they need to impart. Curriculum mapping defines the standards and helps the teachers always keep course goals in sight. The focus and outcomes of the course are clear to everyone. Therefore, teachers and students can work towards the course goals together and achieve the desired outcomes. In the present work locational needs, particularly the needs and requirements of first learner from the social background have been considered

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< 225 >

3. Improves Communication & Collaboration: A curriculum map helps teachers understand what a student has learned in the past and their level of understanding when they begin the next level of a course. When teachers of different areas come together for a curriculum mapping exercise, the resulting curriculum design aligns with the bigger student learning picture. For this purpose help and vision of other disciplines have been considered.

4. Map Student's Progress: A curriculum map defines the different milestones a student needs to achieve along the journey of learning. As students progress through the course, a well-defined curriculum map can highlight the goals they need to succeed. This clarifies the expectations from the students and helps make progress tangible.

5. A Reflective Practice Tool: The curriculum mapping process is a reflective exercise in which educators can assess the teaching and learning experience of the past year. They can assess the course content and its relevance, the learning outcomes, and whether the course content has met their students' learning needs.

6. Improve Students' Learning Experience
A curriculum mapping exercise is essential to improve the students' learning experience in a course. A retrospective look at the past year can bring up many examples wherein the course can be better aligned with student expectations. Over the years, the course content can be revised and enhanced to maintain the program's relevance.

7. Curriculum Flexibility: A curriculum is utilised best when it's designed as per students' aspirations. For this the designing of Core, Programme or Department Elective, Open Elective, Zero Credit, and Audit Courses are significant. This helps institutions to define courses within different buckets and helps students to select the courses of their own choice and thus supports a Fully Flexible Credit System, which also aligns with the latest reforms as per NEP 2020.

Results and Discussions
1. A course map outlines how the objectives, assessments, and instruction in the course is required with respect to the core components.
2. Physical science encompasses physical and chemical sub-processes that occur within systems. At the post graduate level, students gain an understanding of these processes at both the micro and macro levels through the intensive study of matter, energy, and forces. Students are expected to apply these concepts to real-world phenomena to gain a deeper understanding of causes, effects, and solutions for physical processes in the real world. It is also assumed that students will able to understand the ethical and social learning through project, seminar and tutorial works. The present studies are indicative of the further designing of curriculum after mapping. Few interesting features where the workers should go for participative learning via History of atoms, Alchemist, Metallurgy and metals in the ancient society, Medicinal chemistry in the ancient system, Project based unit focusing on social and ethical considerations of using chemistry in real world applications etc.

Table 1: General Chemical Mapping Template

Required Courses	Student will be able to evaluate assets for efficient distribution	Student will be able to prepare a plan for efficient wealth creating and management through chemicals and reactions	Student will be able to evaluate the impact of principles and policies on the different stakeholders	Student will be able to design portfolios of securities and asset classes aimed at achieving personal goals	Student will able to design plants, process etc. independently
CO-1					
CO-2					
CO-3					
CO-4					
Lab-1					
Lab-2					

Table 2: Mapping Stage 1

Required Courses	Student will be able to evaluate assets for efficient distribution	Student will be able to prepare a plan for efficient wealth creating and management through chemicals and reactions	Student will be able to evaluate the impact of principles and policies on the different stakeholders	Student will be able to design portfolios of securities and asset classes aimed at achieving personal goals	Student will able to design plants, process etc. independently
CO-1	X		X		
CO-2		X		X	
CO-3	X	X	X	X	X
CO-4	X		X		
Lab-1		X		X	X
Lab-2		X		X	X

< 226 >

Table 3: Mapping Stage 2

Program learning outcomes					
Required Courses	Student will be able to evaluate assets for efficient distribution	Student will be able to prepare a plan for efficient wealth creating and management through chemicals and reactions	Student will be able to evaluate the impact of principles and policies on the different stakeholders	Student will be able to design portfolios of securities and asset classes aimed at achieving personal goals	Student will able to design plants, process etc. independently
CO-1	I		I		
CO-2		I		I	
CO-3	I	I	I	I	I
CO-4	R		R		
Lab-1		R		R	A
Lab-2		R		R	A

Introduced (I): The skills associated with the program outcome are presented in the course. Reinforced (R) – The skills associated with the program outcome are being worked on at a level above the introductory stage and/or the skills are being developed at a deeper level.

Assessed (A): Students should have developed a sufficient level of competency in the skills associated with the program outcome to have mastered them.

Conclusion

National Education Policy of India 2020 is marching towards achieving such objective by making innovative policies to improve the quality, attractiveness, affordability, and increasing the supply by opening up the higher education for the private sector and at the same time with strict controls to maintain quality in every higher education institution. In this view it is being observed that there is a necessity of reformative investigations on evaluation and assessment system. It has been investigated on the basis of a small sample that proposed tetrahedral assessment system is significant for the overall evaluation, assessment and holistic development of pupil in view of NEP 2020. However after investigations on few other parameters, larger samples, more subjects and programs it can be modulated to octahedral or decahedral system but the primary level or at the beginners level tetrahedral assessment system is better.

References

1. Bhojak N, Bhandari HS, Rathore U, Jatolia SN, Ram R and Verma SK, Green audit & green campus: need of the hour, *International Journal of Current Advanced Research.* 2021; 10(7):24742-43.
2. Divya Joshi & Bhojak N., Institutional Development Plan and NEP 2020: A primary thought, JETIR. 2021; 8(11):524-26.
3. Divya Joshi & Bhojak N., National Assessment and Accreditation Council and Institutional preparedness for NEP 2020, JETIR. 2022; 9(8):68-72.
4. Divya Joshi & Bhojak N., Comparison between national education policy 2020 and national policy of education, IJCRT. 2022; 10(7):345-49.
5. Bharti Bhojak, Divya Joshi, Bhandari H.S. and Bhojak N., Curriculum Mapping For Programs and Courses: Vision NEP 2020, IJCRT. 2023; 11(6):373-78.

< 227 >