TWENTY FIRST CENTURY CURRICULUM DESIGN FRAMEWORK

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The world of today is very different from that of yesterday and we do know that the future will be even more dynamic. It is high time that universities work on redesigning existing curricula to reflect the needs of the 21st century. India is already in the middle of the "demographic dividend" with a surge in its younger and working-age population. Design thinking is a human centered approach. It is a systematic process which helps us develop an understanding of our user/learner needs. It helps to redefine and understand problems in depth and find compelling solutions. It is thus a solution-based approach. If we are to improve higher education to be able to face the challenges of the 21st century, we must focus on the design of a curriculum that addresses the concerns, meets the learning needs of students, takes cognisance of industry requirements, integrates technology along with making the learning experience meaningful, enjoyable and relevant. Higher education must give importance to formative assessments in order to improve the quality of the teaching-learning process. A three-layered 21st century curriculum design framework developed for the purpose proves to be the most apt solution. Understanding each of the layers and their importance in the curriculum design process is paramount if one is keen to develop 21st century curriculum.

PRELUDE

We won't meet the needs for more and better higher education until professors become designers of learning experiences and not teachers. — Larry Spence (2001)

Higher Education in India is at a critical juncture. According to the Insights from the 2019 Deloitte Deans' Summit, "The higher education landscape has expanded over the past decade – from 436 universities in 2009-10 to 903 in 2017-18 and from 26,000 colleges to over 39,000. Student enrolment, at 36.6 million, is the third largest in the world, next to China and the United States. India is already in the middle of the 'demographic dividend' with a surge in its younger and working-age population, which is estimated to become the world's largest by 2030.[1] As per University Grants Commission website there are 1040 universities in India as on February 2020.

In addition, technology advances are changing how we learn and work. Automation, emerging job roles which were never envisaged, skills that require constant upgradation are challenges on one hand and provide immense opportunities on the other. Higher education could play a key role in addressing the disruption that this scenario presents. Some of the concerns that higher education deals with today are:

Lack of Quality Faculty: Faculty vacancies remain high. Example - There are about 19-20 open positions in institutes, of which only 5–6 have been appointed.[1] Skill gap is also a major concern.

Subject Experts Not Teachers: Faculty are subject experts and are not trained on how to teach better.

Employability of Students: According to the *India Skills Report* in 2019, only 47 per cent of the available talent is employable.[2]

Freedom of Speed: Number of hours are tied to the number of credits. Students do not have the freedom to gain the credits in lesser amount of time. We give freedom in other fields but not in the field that we need the most.

Lack of Life-long Learning Skills: 'Learning to Learn' is not understood and is a missed out component of the curriculum.

Lack of Research Skills: Research Skills and research per say is lacking.

If we are to improve higher education to be able to face the challenges of the 21st century, we must focus on the design of a curriculum that addresses the concerns, meets the learning needs of students, takes cognizance of industry requirements, integrates technology along with making the learning experience meaningful, enjoyable and relevant.

21ST CENTURY CURRICULUM DESIGN FRAMEWORK

A three-layered 21st century curriculum design framework proves to be the most apt solution (Figure 1).

At the core of this three-layered framework is *Design Thinking*. The second layer is *Backward Design* and the third layer is the $KSSL_{TM}$ Framework (Knowledge – Skills – Self Awareness and – Learn to Learn). While using this three-layered framework, the faculty changes their role from that of a teacher to a designer. This completely changes the quality of outcome and the mindset. Faculty should consider themselves to be designers, a much-needed shift in thinking. Understanding each of the layers and their importance in the curriculum design process is paramount if one is keen to adopt this framework.

Design Thinking

Computer Scientist and Nobel Laureate Herbert A. Simon was the first to mention design as a science or way of thinking in his 1969 book, *Sciences of the Artificial*.[3] Design Thinking[4] was popularised by IDEO, the design firm. Tim Brown, the founder of IDEO has explained how design thinking can be used to come up with innovative solutions in his book *Change by Design*.[5]

Design thinking is a human centered approach. It is a systematic process which helps us develop an understanding of our user/learner needs. It helps to redefine and
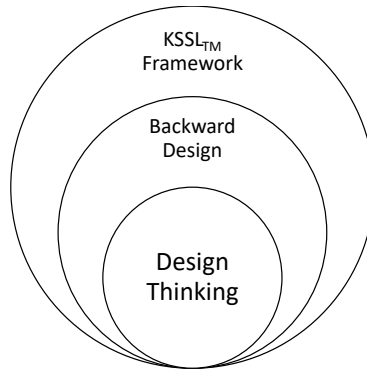
FIG. 1: THE THREE-LAYERED 21ST CENTURY
CURRICULUM DESIGN FRAMEWORK

understand problems in depth and find compelling solutions. It is thus a solution-based approach. Brands like Apple and Google have adopted Design Thinking successfully, so have many Universities. Stanford University has a well-defined course on Design Thinking. The Stanford design school called d. school has proposed a five phase model for Design Thinking (Figure 2).
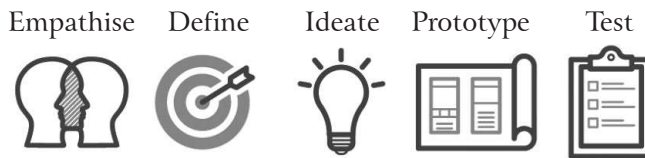

FIG. 2: FIVE-STEP DESIGN THINKING PROCESS
Source - https://www.interaction-design.org/literature/article/
what-is-design-thinking-and-why-is-it-so-popular

The phases of the Design Thinking process are restated below with reference to higher education:

Empathise: Empathise with your learners. Understand their needs, their interests, their aspirations, what do they feel, see, hear. Why do they want to take up a programme or course? What do they expect from the programme?

Understand Stakeholders' Needs: What does the industry expect; what must students be able to do when they join the workforce; what is the expected knowledge, skills, abilities and attitudes that are expected as a working professional; and what does society expect from students who graduate from specific courses?

Designers create user or consumer personas in the 'Emphathise' phase. For learning to be purposeful and relevant, we must create learner personas. Learner personas are learner profiles which we will cater too. When we create a detailed picture of who our learners are, it helps us to design a course which will be engaging and relevant for our learners.

Define: Define learner and stakeholder needs. What are the insights from the Empathise phase? Are the learner and stakeholder needs aligned with the purpose of the programme or course?

Ideate: Question existing assumptions of course design. Think of innovative and engaging ideas and strategies to make learning compelling and purposeful.

Prototype: Design the curriculum. Design representative units applying pedagogy and strategies which will engage learners and make them an active participant in the learning process.

Test: Test the curriculum. When units are taught note what works and what can be enhanced.

Design thinking is an iterative process. It is an ongoing, continuous process of quality improvement.

It is important to understand that the five phases are not sequential. They can overlap and iterations can be done to keep improving the understanding of the needs and thus the design of the curriculum.

Backward Design

When designing curriculum, usually the first consideration is the content – how to teach it, then the materials or the textbooks that are to be referred to, the assessment and then the alignment with the outcomes or objectives.

Backward Design is a framework for curriculum design proposed by Grant Wiggins and Jay McTighe in their book *Understanding by Design.*[6] They propose a reverse process to the usual curriculum design. Thus, we begin with the end in mind as Steven Covey says. When we know our destination, we can think of where we are and then plan the steps to reach where we want to go. This reverse process ensures alignment between outcomes, learning content or activities and the assessment. Backward Design goes through three stages (Figure 3).[7]

Stage One – Identify Desired Results: What should students know, understand and be able to do?

Stage Two – Determine acceptable evidence: How will we know if students have achieved the desired results and met the standards?
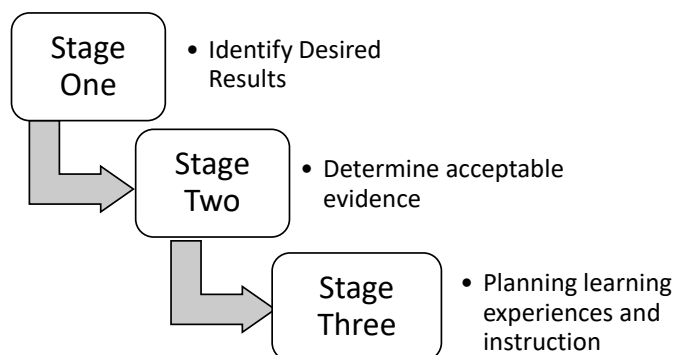

FIG. 3: BACKWARD DESIGN STAGES

Stage Three – Plan learning experiences and instruction: With clearly identified results and appropriate evidence, the learning activities can now be planned.

The process of Backward Design is well articulated for Higher Education by Mackh in his book *Higher Education by Design* as a course planning flowchart (Figure 4).[8]
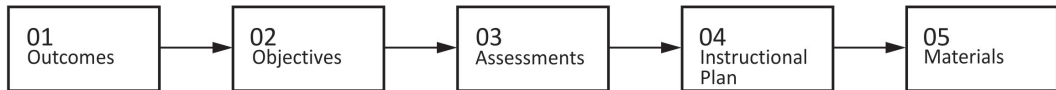

FIG. 4: COURSE PLANNING FLOWCHART – HIGHER EDUCATION BY DESIGN [7]

The course planning flowchart which is based on Backward Design has five stages:

1. *Outcomes* – As we begin with the end in mind, defining the outcome is the first stage of the curriculum design process. Outcomes are the knowledge, skills and abilities students should possess when they complete a programme or a course.

    If the programme outcomes are defined (as per specified standards) the next step is to define the course outcomes. Fink's (2003) questions on curriculum design are a great way to start when writing the outcomes: What is it I hope that students will have learnt, that will still be there and have value, several years after the course / (programme) is over (outcomes).[9]

2. *Objectives* – Objectives are specific and define the skills or knowledge that students will acquire or demonstrate at the end of completing a learning activity or lesson or session.There is usually a confusion between what outcomes are versus what objectives are. Most of the time they are used interchangeably. Iowa State University's Center for Excellence in Teaching and Learning have a practical and useful definition of outcomes and objectives: "Outcomes are where we want to be; and Objectives are steps needed to get there." This definition equips the curriculum designer with a powerful tool – define the Outcomes and for every Outcome define a set of objectives – the steps that will take the learner towards the outcome. This way the outcomes and objectives are consistent and align with each other. Objectives and Outcomes must be measurable. Using action verbs from Blooms Taxonomy to define them makes them specific.

3. *Assessments* – Going back to Fink (2003)[9] the next question to be asked is, "What would students have to do to convince me that they have achieved the defined outcomes?" Traditionally, assessments are considered at the end of the unit and are largely summative – a final examination. However, in backward design, assessments are designed as soon as the objectives are defined. This helps to structure a learning experience which will ensure attainment of the objective. For example, if the objective is to 'Justify the use of solar panels', then the learning activity must be pitched at a higher level so that students justify the need and not just 'explain' how solar panels can be used. 'Justify' is a higher order action verb than 'Explain'. Because we defined the assessment first, we know at what level to pitch the content or learning activity. If we had not done that then after defining the objective, we would have thought of the

learning activity and the content that was suitable, not necessary the level that it has to be pitched and then the assessment would have followed at the end of the unit which would not have aligned with the objective at all.

Another point of consideration is that ongoing and continuous assessment checks understanding for every objective, thus making it easier for in-flight corrections to the strategies that are being used. Students also get interim feedback on their progress and have a much better sense of what they have understood, what they must work upon when formative assessments are conducted. Higher education must give importance to formative assessments in order to improve the quality of the teaching-learning process.

It is important to note that after defining the assessment type, the mechanism – marks, rubrics and checklists for grading the assessment must also be chosen. Defining assessment after the objective helps in scheduling them in the learning process.

4. ***Instructional Plan*** – An Instructional plan can begin with dividing the course into modules and further topics or sub-topics. Choosing appropriate instructional strategies which enable active learning is the next step. These include: interactive lectures, project-based learning, case study, flipped classroom, debates, demonstrations, group work, group discussions, paired learning all can make learning interesting. A detailed session plan gives faculty a guideline and the same can be worked upon as it is implemented. Ensuring that the instructional plan aligns with the objective and the assessment is paramount. Creating a session plan requires involvement and preparation. Gaining attention at the start of the session is most important and specific strategies must be used to appeal to students. Enriching and extending learning at the end of the session is equally important. When students can apply their learning in newer contexts, learning transcends beyond the classroom.

Reflection is yet another strategy which can be a powerful learning tool. Getting students to reflect on the problem at hand, the experience, the situation and the learning has a deep impact on understanding of one's own thinking, progress and gaps in learning.

5. ***Materials*** – Choosing materials in the form of textbooks, web references, videos, real life situations etc. are done in the last in the Backward Design process.

The KSSL$_{TM}$ Framework

The third layer of the three layred 21st Century Curriculum Design Framework is the *KSSL$_{TM}$ Framework* (Knowledge – Skills – Self Awareness and – Learn to Learn) (Figure 5).

Knowledge – Traditionally, curriculum has always been content heavy. What is required though is a connect with the real world in order to make learning deliver to requirements stated by the industry and society of making students employable and the knowledge that they gain is relevant.
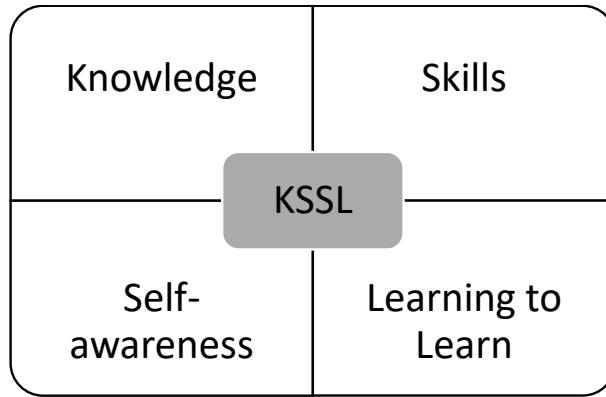
FIG. 5: KSSL~TM~ FRAMEWORK

For students to be employable, performance objectives are the key. They must know what to do (perform) than just know what it is (concept understanding). When performance is the focus, concept understanding is given. Thus, the focus of the knowledge component is on:

- Connecting content to real life and bringing in the required relevance.

- Redesign from a topic-based (knowing what it is) to a performance based (knowing what to do) curriculum.

Skills – Skills are psychomotor as well as cognitive. They are about the abilities that students develop to perform various tasks. The 4Cs – Creativity, Critical Thinking, Communication and Collaboration – are known as the 21st century skills, which are important for students to survive and work in a local-global workplace. So is the ease of using technology. Thus, the focus of the knowledge component is on:

- Encouraging abilities to apply knowledge in real world situations.

- Enhancing the 4C Skills.

- Awareness and skills of using technology for change.

Self-Awareness – Self-awareness means knowing your true feelings, thoughts, abilities and actions. It is also about knowing that your actions affect others. In today's demanding world being self-aware is critical. Self-awareness can be developed. It is a process of tuning in, reflecting, introspecting. Knowing what you are feeling, labelling that feeling is the most important aspect. Understand ourselves builds positive self-esteem. It helps to recognise strengths and gives us insights to overcome challenges. A 21st century curriculum is not just about building knowledge and skills; it is also about making students aware of the benefits of being self-aware. Thus, the focus of the self-awareness component is on:

- Practicing Mindfulness – Mindfulness is paying attention in a conscious way without judging to the present moment

- Developing confidence

- The right mindset

- Emotional intelligence

Learning to Learn – Awareness of one's own learning and cognitive ability, managing own learning, building on previous knowledge, thinking about thinking (metacognition) are all essential to building competence and lifelong learning skills. In today's world, technology is evolving at such great speed, new jobs and roles not heard of before are emerging. Learning to Learn skills will enable students to cope up with the ever changing and demanding work challenges. Thus, the focus of the Learning to Learn component is on:

- The awareness of one's own learning abilities

- Reflection on each aspect of: Knowledge, Skills, Self-awareness

- Learning from reflection

CORRELATION BETWEEN THE THREE LAYERS OF THE 21ST CENTURY CURRICULUM DESIGN FRAMEWORK

Table 1 gives the correlation between the three layers of the 21st century curriculum design framework.

TABLE 1: CORRELATION BETWEEN THE THREE LAYERS OF THE 21ST CENTURY CURRICULUM DESIGN FRAMEWORK

Design Thinking	Backward Design	KSSL$_{TM}$ Framework
Emphathise and Define – Creates learner personas and provides insights on the needs.	**Outcome – Objectives:** Use insights from the Emphathise and Define phase. Cater to the learner personas created.	**Define** the KSSL components for the identified learner person as and the expected needs that are to be met.
Ideate – Think of innovative strategies that will make learning interesting	**Instructional and Assessment Plan** – Use of engaging strategies for both to make learning enjoyable	**Design** – Connecting KSSL to real life and bringing in the relevance. Bringing in skills on Creativity, Critical Thinking, Communication and Collaboration in the design of learning activities.
Prototype – Designing representative units	**Design** of the curriculum map using the five stages: Outcome – Objective – Instructional Plan – Materials	**Design** – Integrating the KSSL components in the curriculum map

IMPLEMENTING THE 21ST CENTURY CURRICULUM DESIGN FRAMEWORK

The world of today is very different from that of yesterday and we do know that the future will be even more dynamic. It is high time that universities work on redesigning existing curricula to reflect the needs of the 21st century. The journey has begun. The 21st century curriculum framework is being implemented in educational institutions and universities. Following is an example of its implementation:

> *Mode of implementation*: Interactive and hands-on workshop
>
> *Client*: Renowned educational institution in the region with more than 30 years in the field. Recently received University status.
>
> *Participants*: Deans, Principals, and senior faculty responsible for curriculum/course design
>
> *Duration*: Three days spread over two segments

Workshop Methodology

The workshop focuses on:

- Learning by doing;
- Learning from each other;
- Learning through reflection.

The three-day workshop is divided into two segments:

Segment One

Day One

- Defining the Purpose
- Importance of Needs
- Learner Personas
- Design thinking
- Backward Design
- Understanding the $KSSL_{TM}$ framework for curriculum design
- Group Assignment
  - Empathise – Interview stakeholders
  - Creating an Empathy Map
  - Identifying Learner Personas
- Reflection – My Learning

Segment Two

The group meets after one week for a two-day session.

Day Two

- Review of insights from the Emphathise Phase
- Understanding the identified Learner Personas
- 21st Century Learning Strategies
- Assessment Strategies
- Flipped Classroom
- Home Assignment – Flipped Classroom
- Reflection – My Learning

Day Three

- Experiencing a Flipped Classroom
- Blooms Taxonomy
- Curriculum Design Template
- Group Work – Create a Prototype Curriculum Design Document (participants work in groups and focus on one unit)
- Group Presentations - Prototype Curriculum Design
- Discussion and Feedback
- Reflection – My Learning
- Workshop Wrap-up

The workshop has mindfulness activities embedded across the three days.

The key points that emerge from the workshop are:

Student Needs

- Students seek newer career paths and want to know what options are available.
- They want to learn in groups as well as individually.
- They want to upgrade their skills.
- They seek enriching learning environments.
- They want practical knowledge.
- They are open to working on real-world problem solving assignments.

- They are open to doing bridge courses to close their knowledge gaps.

- They are open to using technology to learn.

Industry Needs

- Industry would like higher education to focus on hands-on experience.

- They want students to be equipped with current knowledge in the field.

- They feel students are conceptually weak and lack in application of knowledge.

- They feel that soft skills are lacking in today's graduates.

- They see a lack of problem-solving skills in students.

- They feel that students are not workplace ready.

While faculty are entrusted with the task of redesigning the curriculum and using active learning strategies to ensure student participation in the learning process, they have their own fears and realise their own skill gaps. Some of the fears that emerge w.r.t curriculum redesign are:

- Getting expert faculty

- Getting students to enroll into new courses

- Will new thoughts and approaches be accepted?

- Will we be able to keep pace with industry and the technology changes?

The hope that they have for using a 21st century curriculum design approach is that:

- Courses will meet industry needs;

- Students will be employable;

- Quality will improve;

- Society upliftment;

- Faculty will be trained in newer pedagogy;

- Expertise can be built and shared using technology;

- Innovative curriculum design will attract students to the class;

- It will raise the benchmark; and

- The Industry – academia collaborations will enhance the overall programme.

Some of the training needs that emerge for higher education faculty through this workshop are:

- Understanding Educational Theory and Practice

- Designing and planning effective learning experiences

- Writing effective outcomes and objectives

- Rubrics and how to design them

- Using technology for academic engagement

- Effective use of Assessment as a learning strategy

- Self-Awareness

- Learning to Learn – Life-long learning skills

In Conclusion

The 21st century has brought about diverse challenges – from climate changes, to globalisation, employability and even personal happiness. Technology is disrupting in all walks of life. Education is lagging.

If we are to make a meaningful difference, we must revisit what and how we teach, we must get to know our learners better and we must change our roles from being faculty who are the sage on the stage to designers who craft significant, purposeful, enjoyable and relevant learning experiences for our students. We must inculcate the attitude of being designers in the 'school called life' in our students as well, so they can take on the world with confidence and bring about the much-needed change.

Design Thinking is an attitude which helps in finding creative solutions to problems. Till date the focus of education has been on the transfer of content and knowledge bytes. The focus has never really been human centric. Using Design Thinking for curriculum creation is a game changer. The journey is all about moving from: knowledge transfer; outcome; student centered education to one where individual creativity; co-creativity; the ecosystem of learning; and ensuring that learning for development are encouraged and nurtured.

It is time for a 21st century curriculum design to take on the lead!

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