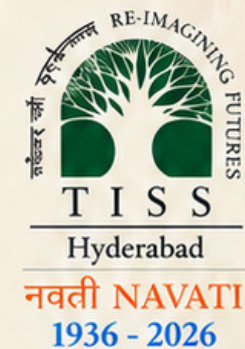


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DEVELOPING OERs FOR SOCIAL SCIENCES  
IN RESOURCE-CONSTRAINED  
SETTINGS

*Role of Adaptive SoPs in Navigating Challenges*

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Working Paper No. 08  
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# Developing OERs for Social Sciences in Resource-Constrained Settings

## *Role of Adaptive SoPs in Navigating Challenges*

Richa Sharma<sup>\*</sup>, Sonia Sawhney<sup>\*\*</sup>, Sourya Banerjee<sup>\*\*\*</sup> and Shaily Bhadauria<sup>\*\*\*\*</sup>

### Abstract

Interactive Flat Panels (IFPs) and Open Educational Resources (OERs) can enhance learning when materials are contextualised to learners' realities. This paper presents a practice-informed conceptual account of developing social science OERs for secondary schools in Telangana, India. Here, context specific constraints such as offline access, licensing, multilingual classrooms, and political sensitivities complicate standard OER development (curation and creation) approaches. Using ethno-analytic reflection and a systems approach, we analyse how the project shifted from curation to creation and how, in response, adaptive Standard Operating Procedures (SoPs) emerged. We show that OER development in such settings functions as a socio-technical system shaped by institutional mandates, epistemic features of the specific discipline, and negotiated openness. The paper contributes an eight-step adaptive SoP framework and a subject-specific design principle set, offering systemic heuristics for multiple stakeholders within educational ecosystem including state education departments, teacher education institutions, and EdTech practitioners in the Global South.

**Keywords:** Open Educational Resources (OERs), social science education, system thinking, adaptive Standard Operating Procedures (SoPs), resource-constrained setting

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## **1. Context**

Open Education Resources (OERs) embedded in Interactive Flat Panels (IFPs) open up possibilities of improving and enriching learners' learning experience in schools by fostering immersive engagement. However, the effectiveness of these technologies depends on the contextualisation of learning materials to the learners' local context (Mishra, 2004).

The School Education Department, Government of Telangana (GoT), oversees 26,040 schools in the State of Telangana, employing 1,07,259 teachers and serving 21,50,626 students. Its mandate includes the assurance of quality education and enhancing teaching-learning practices within the State's public education system. The Government of Telangana, recognising the transformative potential of Interactive Flat Panels and quality Open Educational Resources, collaborated with the School of Educational Studies (SES) and the Centre for Excellence in Teacher Education (CETE) at Tata Institute of Social Sciences (TISS) to curate and create OERs that align with the state syllabus. The collaboration aimed to enhance the teaching-learning process and promote interactive, inclusive and collaborative learning in the State's Secondary Schools. Through the OERs, the collaboration also aimed to foster transferable competencies i.e. critical, creative and thinking in the learners, while also promoting teachers' professional development. The curation was carried out for Telugu, English, Urdu, Mathematics, Biology, Physics and Social Science.

To begin with, the team at TISS, along with the State Council of Educational Research and Training (SCERT), Telangana, undertook a pilot study. Based on the learnings of this initial study, a full-fledged OER curation process was conceptualised and conducted for all subjects from grades 8th to 10th.

This paper employs an ethno-analytical reflection and a systems approach to examine the team's experience of curating and creating OERs for social sciences education for grades 8th to 10th.

### ***1.1 Problem and gap***

Existing literature on OERs concerns access, licensing, content quality, and teacher use etc. But attention to the systemic processes required to develop social science OERs in resource-constrained state education systems is specifically missing in the Indian or global south context. Many accounts describe project implementation or evaluate resource use (Bozkurt et.al, 2019; Miao et al, 2019), but fewer analyse how standard operating procedures must adapt when projects operate across mul-

multiple institutions, languages, infrastructural constraints, and epistemically sensitive content. This paper addresses that gap by treating OER development as a system and deriving adaptive SoPs from a large-scale, state-led initiative in Telangana.

### ***1.2 Research questions***

Guided by this focus, the paper addresses the following questions:

1. What systemic challenges arise in developing social science OERs for resource-constrained state education systems?
2. How do project actors negotiate technological, institutional, epistemic, linguistic, and ethical constraints?
3. How do adaptive SoPs emerge as responses to these challenges, and what conceptual insights do they offer for OER development as a system?

## **2. Methodology**

This was an inter-institutional, multi-stakeholder project. Given the multiplicity of actors and processes and diversity within and among various data sources, we retrospectively adopted a qualitative research architecture to be able to systematically answer our research questions. This section provides details of the research architecture within which this work has taken shape.

### ***2.1 Data and analytical process***

Our data sources included minutes of the formal project meeting records, workshop notes, OER developers' journals, text messages from team groups on Telegram and WhatsApp, project documents, and informal discussion notes.

We first organised these materials chronologically. The sequencing helped us identify key episodes involving design, coordination, implementation challenges and instances of negotiations. These episodes were iteratively reviewed and grouped into thematic categories such as infrastructure, licensing, language, content sensitivity, perspective concerns, institutional coordination, teacher readiness, and technology adoption. We then mapped these themes onto the Iceberg model's layers (events, patterns, structures, mental models) and compared them with the RAP rubric (CETE, 2023) to identify recurring adaptive responses. Disagreements among authors regarding

| #  | Data Source                             | Approximate Time Period | Purpose in analysis                                                               |
|----|-----------------------------------------|-------------------------|-----------------------------------------------------------------------------------|
| 1. | Project Meeting Records                 | June 2023–December 2023 | Tracking decisions, concerns, reoccurring issues and suggested solutions          |
| 2. | Reflective Journals                     | June 2023–February 2024 | Recording individual observations and interpretations                             |
| 3. | Text messages (Internal Communications) | June 2023–February 2024 | Examining negotiation instances, point of contentions, tensions and convergence   |
| 4. | Draft of OERs (Revision drafts)         | June 2023–February 2024 | Tracing changes in content and design                                             |
| 5. | Review comments and feedback            | June 2023–February 2024 | Identifying external and internal responses; points of divergence and convergence |

interpretation were discussed explicitly and, where relevant, retained as evidence of divergent mental models within the system.

## 2.2 Positionality

We, the authors were designers, facilitators and subject-matter experts of this OER initiative. Thus, we occupied an insider position. It provided access to project discussions and informal processes which were invisible to external researchers. While this position carried the risk of selective recall and over-identification with project decisions, we mitigated this challenge by triangulating reflective accounts with documentary evidence, revisited points of disagreement, and treated project decisions as objects of analysis rather than as automatically valid solutions.

## 2.3 Conceptual framing

Conceptually, the paper is organised around three layers. **First**, systems thinking provides the overarching analytical frame for understanding OER development as an interaction among actors, resources, institutional structures, and assumptions. A systems approach, which views experiences, challenges and solutions as part of an interconnected system (Senge, 1990), enabled us to objectively study our experiences. It views any system as an interconnected entity of things, including people and places, etc., which then evolves its own pattern of behaviour. Meadows, writing about the Systems Lens, defines a system as “a set of things—people, cells, molecules, or whatever—interconnected in such a way that they produce their own pattern of behaviour over time. The system may be buffeted, constricted, triggered, or driven by outside forces. But the system’s response to these forces is characteristic of itself, and that response is seldom simple in the real world” (Meadows, 2008, p.38). Such an understanding enabled us to understand our roles vis-à-vis others who

were all part of the project, in terms of the structural dynamics, interdependencies, evolving processes, feedback mechanisms and other interacting components which determine the outcomes of a project. The approach allowed us to revisit our experience of OER development of Social Science Subject (within the larger context of OER developments for Class VI, VII, and VIII for all subjects) as a system embedded in institutional contexts, culture, mandated regulations, policies, pedagogical vision, content requirements, technological infrastructure (IFP and other digital tools) and stakeholders' beliefs and attitudes. Within which each one of us (authors) acted in different capacities with designated roles and responsibilities.

**Second**, ethno-analytic reflection serves as the mode of inquiry, enabling systematic examination of our experiences, documents, and decisions as insiders. Ethno-analytical reflection method, on one hand, is inferred from the ethnographical traditions where account of one's lived experiences and all the constituent entities thereby becomes a data set (O'Reilly, 2012) and on the other rests on the nuanced, context-driven, analytical reflection (Schön, 1983) of practices, beliefs and values and institutional settings. The two together provided a model of iterative analysis of the available data sources.

**Third**, the Relevance–Affordance–Pedagogical Practice (RAP) rubric (CETE, 2023) and the emergent adaptive SoPs function as operational frameworks that translate systemic insights into practical procedures. The Iceberg model is used as an analytical tool within systems thinking to distinguish visible events from underlying patterns, structures, and mental models. Discussions of openness and social science epistemology are included insofar as they illuminate why standard OER procedures require adaptation in this context.

Together, these are the processes from which patterns of a system emerge. For, new systems arise from within a given environment (conventions, norms, rules-regulations, beliefs and attitudes, tangible and intangible forces) by way of evolving certain processes and patterns over a period of time. Actors drive a system towards its intended purpose through their actions, decisions, and influence, which they exert over given elements and interconnections. Actors interact with their environment through means of certain resources. They may invent new resources, redesign or simply resume existing ones, depending on what the environment offers.

Reflecting back on the project structures and procedures through the systems approach in terms of actor-resources-environment-processes (Meadows, 2008), the following system seems to have emerged:

- The ‘core actors’ here were TISS faculty (2) with pedagogical-content knowledge (PCK) expertise, research assistants (RAs) (2), an external subject matter expert (SME), Resource Persons (RPs) (4) who were subject teachers from government schools across the state and one SCERT faculty, together they represent two main Institutional actors, i.e., the State Government of Telangana State and the Tata Institute of Social Sciences. Apart from these actors, the system had other key actors, namely Quality Control Panel (QC Panel) Members.
- The ‘core resources’ were IFP (Hardware) and AI and other digital tools, including Open/closed repositories and RAs and RPs.
- The essentials of the environment were constituted by the institutional mandates, cultural-linguist context of the state (Telugu, English and Urdu as medium of instruction), infrastructural constraints (internet non-availability, etc.) and perspective-based diversity among stakeholders.
- And, finally Relevance-Affordance-Pedagogical Practices (RAP) Rubric, the general and subject-specific design principles and the iterative design loop for arriving at an OER template form the processes of this system.

| Actors                                                                                                                                                                                                                                                                                                                                       | Resources                                                                                                                                                                        | Processes                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Government of Telangana</b> <ul style="list-style-type: none"> <li>• A SCERT Faculty</li> <li>• 4 Resource Persons (Government School Teachers)</li> </ul> <b>Tata Institute of Social Sciences</b> <ul style="list-style-type: none"> <li>• 2 PCK Experts</li> <li>• 2 Research Assistants</li> <li>• 1 Subject-matter expert</li> </ul> | <ul style="list-style-type: none"> <li>• Interactive Flat Panels (Hardware)</li> <li>• AI and the other Digital Tools i.e. H5P</li> <li>• Internet</li> <li>• Gadgets</li> </ul> | <ul style="list-style-type: none"> <li>• The Relevance-Affordance-Pedagogical Practice (RAP) Rubric</li> <li>• Subject-specific design Principles</li> <li>• Iterative Design Loop</li> <li>• OER Templates</li> <li>• Activities within a template</li> </ul> |
| <b>Environment:</b> Institutional mandates, cultural-linguist context of the state (Telugu, English and Urdu as medium of instructions), infrastructural constraints (internet non-availability etc.) and perspective based diversity among stakeholders                                                                                     |                                                                                                                                                                                  |                                                                                                                                                                                                                                                                |

**Figure 1.** The System of OER Development: Actors, Resources, Processes and Environment

Conclusively, to formulate our learnings from the project, which we thus conceive as a system of its own, we employ the Iceberg Model as popularised by anthropologist Edward T Hall (1976). It is inspired by the famous metaphor of an iceberg, of which only the tip is visible, whereas significant parts are underneath the surface. Taking on from there and finding its roots in the systems-thinking, the model helps understand implicit and explicit layers of a given system (Matsietsi, 2024). Model’s

inherent components, i.e. Events, Patterns, Structures, and Mental Models, provide the functional tools through which complex experiential reflections could be classified and articulated in a clear, distinct and succinct way, which then enabled us to draw a SoP.

### **3. Initiating the curation of OERs for Social Sciences**

A three-day workshop was conducted to orient the subject teams to the project's objectives and the RAP framework and to deliberate on design principles and procedures for curating OERs. The most critical element involved a session during which each subject group collaborated to arrive at design principles and curate a sample subject-specific OER for demonstration purposes. This facilitated the identification of foundational topics from various chapters that required improved conceptual understanding. Areas in which students faced challenges in comprehending or could gain from visual representations were also identified. Learning outcomes for these topics were subsequently identified. Consequently, a multi-stage curation process was implemented.

This entire curatorial process was guided by the RAP rubric, design principles (as discussed ahead) and learning outcomes. The identified resources were adapted to align with the pedagogical and curricular needs, and activities were designed following the project's motto: Interactivity, Inclusivity and higher-order thinking. A template for OER curation was developed to facilitate teachers' understanding of optimal resource utilisation in their respective classes. The template outlined the learning outcomes, resources, and activities to be implemented, along with instructions for utilising the resources, enabling teachers from the various districts within the state to comprehend their application in the classroom. This template, in the form of a lesson plan, included recommendations for assessments that teachers could utilise to evaluate learning outcomes. Based on the collective deliberations between the TISS faculty and the RAs, the RAs developed lesson plans, which then underwent review by TISS faculty. Once approved, they were forwarded to the SME and the RPs. This was followed by a subsequent review by the Quality Control Panel (QC panel) and the SCERT faculty. The suggested revisions were integrated, and another round of clearance was sought. Post this, the lesson plan attained final status.

A deeper analysis of these processes and iterations reveals that (I) the RAP rubric (with its 3 critical parameters and 15 indicators), which was developed by the TISS faculty prior to the commencement of the curation process and (II) the subject-specific design principles emerged almost like two major sub-system within the system (Bertalanffy, 1968; Pattee, 1973). While the RAP rubric

governed not just the quality and context-readiness aspect, but also some of the procedural components. It helped shape the interactions among multiple actors and among actors, resources and the environment. The subject-specific design principles, on the other hand, governed entire resource curation and activities planning within a subject team. Given that each subject would need differentiated planning and development of frameworks, the following subject-specific design principles were identified for social sciences:

- **Principle of Mapping and visualisation:** Enable students to map out and visualise concepts, establish cause and effect relations of different phenomena, and understand concepts in Local as well as global contexts.
- **Principle of enabling multiple perspectives:** Enrich a holistic understanding of different concepts and help students to approach ideas and issues from different perspectives.
- **Principle of recognition and inclusion – local culture and knowledge:** This principle helps us to attain the objective of representation and appreciation of local culture, knowledge, and values.
- **Principle of multidisciplinary approach:** Enable the students to understand the linkages between the different disciplines within social studies, rather than study them in an isolated manner.
- **Principle of analysis, reflection and application:** Help develop critical thinking and problem-solving among students regarding different concepts.
- **Principle of active citizenship and constitutional values:** Help develop social consciousness, promote constitutional values and create responsible citizens of tomorrow.

These principles operationalised the epistemic features of social science (normativity, plurality, values) within the OER design process. They also anticipated the need for adaptive procedures, since applying them in a large-scale, multi-actor project required continuous negotiation among pedagogical priorities, curricular mandates, and technological constraints and divergent perspectives.

#### **4. Immersing in the Curational Process: Emergent Challenges and Prospects**

Developing lesson plans for this project necessitated that they be interactive, providing students with opportunities to be active participants in their learning. This represented a notable departure from the traditional ‘teacher-centred’ approach. In the traditional model, teachers occupy the cen-

tral position within the power structure of the classroom. Therefore, all activities and resources are structured for their use, and they determine the experience deemed appropriate for the learners (Sarangapani, 2021). Within the present project, this pattern was to be disrupted by engaging students as equal participants in the teaching-learning process and knowledge creation.

#### ***4.1 The Open/Close Dichotomy***

The primary challenge encountered by the team revolved around the regimented open/close dichotomy (Mishra, 2017). Amidst a plethora of resources, one had to determine what was ‘open’. The solution resides in comprehending the definition of OER and the criteria for assessing its ‘openness’. Pomerantz and Peek (2016) analysed the dimension of openness within open research, education, and open government efforts, identifying five essential aspects: rights, access, usage, transparency, and participation. Smith and Seward (2017) examine it as a social praxis comprising three unique processes: open creation, open distribution, and open consumption. Open Educational Resources (OERs) are materials and resources designed for teaching, learning, and research that are deliberately generated and licensed to be freely owned, shared, and, in most instances, modified by the end user (Miao et al, 2019). To qualify as an OER, a resource must meet two criteria: it must be educational and it must be open for use, sharing, and, in certain cases, modification. The second criterion originated in 2002 during the Forum on the Impact of Open Courseware for Higher Education in Developing Countries, convened in Paris, where the phrase Open Educational Resource was introduced (UNESCO, 2002). The foundational notion of ‘openness’ about attitudes, behaviours, and beliefs towards knowledge was evident much earlier than 2002 in the writings of Karl Popper. Popper’s concept of openness, defined as “tolerance towards diverse views, religious thoughts and critical questioning” (Popper, 1945, p. 369), warrants particular consideration in the development of OERs for Social Science education. This is due to the philosophical underpinnings of openness of resource materiality, which also permeate the curricular and pedagogical dimensions of Social Science as a school discipline.

In practice, however, the project encountered licensing restrictions, ambiguous permissions, and resources that were educationally valuable but not reusable under open licences. These tensions indicated that OER development in state systems cannot rely on a fixed notion of “open” versus “closed.” Instead, it requires procedural mechanisms — such as staged rights review and flexible licensing pathways — that treat openness as a negotiated and context-sensitive process. This insight directly informed the adaptive SoPs related to resource selection, adaptation, and creation, partic-

ularly the steps that institutionalise rights checks at multiple stages and allow for parallel curation and creation tracks when licensing is uncertain.

#### ***4.2 The Normative Nature of Social Science***

Social sciences, in contrast to the natural sciences, are more receptive to diverse viewpoints and perspectives. Teachers across educational boards and grades will agree that social sciences encounter the ‘value problem’ to a greater extent than their scientific equivalents, where the ‘ought’ question is frequently distinct from the ‘is’ question (Owen, 2020). In science, validating a theory is a definite procedure: the scientific method provides conclusive resolutions, at least until new, contradictory evidence is discovered and tested. However, this is not the case in social science, where the issues are frequently open-ended and subjective. Consequently, simulation-based applications or tools for elucidating concepts or obtaining immediate values through data input are absent. For instance, the precision of equality, degrees of freedom or the existence of democracy cannot be quantified digitally via an application. Although this point is subject to debate, the clarification of this is not the object of the topic. Thus, the significant distinction between the Social Sciences and other academic disciplines is revealed. Social Sciences involve critical analysis through the identification of causes and consequences, the defence of opinions by informed judgments, criteria-based evaluation of social phenomena and the proposal of alternative solutions to life situations.

The National Curriculum Framework (NCF) 2005 articulates that the social sciences are equally amenable to scientific inquiry as the natural and physical sciences, employing methods that are “distinct (but in no way inferior) to those of the natural and physical sciences” (p. 51). An examination of an incident through a physical science perspective may be counterproductive to people from the perspective of the Social Sciences. It gets even more complicated when we add to this the normative responsibility to create and widen the popular base for human values (NCF 2005). It is in light of this background that we initiated the curation and creation of OERs in the Social Sciences.

This normative and interpretive nature of social science implies that resource development must include explicit procedures for reviewing representation, perspective, and value-laden content. In the project, this manifested in extended deliberations over which narratives, images, and examples were appropriate or inappropriate, and in the need to balance academic rigour with political and social acceptability. This requirement is reflected in the adaptive SoPs that institutionalise multi-perspective review, consensus-building among diverse stakeholders, and explicit attention to con-

stitutional values and local contexts.

#### ***4.3 Finding context-relevant/localised resources***

As previously noted, online open resources are scarce for the Social Sciences, resulting in the team's consistent inability to achieve deadlines compared to the other subject groups. The available resources weren't open; the open ones presented alternative challenges, such as English accents that would be difficult for students to comprehend, a lack of subtitles, high video speed or huge image size. In multiple review processes, we received feedback to draw on the local context. For example, while reviewing a lesson plan for Chapter 9 (Grade 8): Public Health and the Government, an RP commented, "Can't we get a video of Telangana state Asha workers to make the video more relatable to the students?". There were numerous instances when the team was advised not to use certain videos or images due to the absence of Creative Commons licensing or the depiction of the content using regional context and practices. This is not to say that there is a complete lack of readily available educational resources for the Social Sciences but they either lacked the direct relevance (within a context) or required internet as precondition of usage. This is what turned the effort focused on the curation of OERs to creation. However, despite the team's decision to create resources, the fundamental issues persisted. To create resources, we needed primary resources such as media in the form of pictures, diagrams, videos, animations and software that would facilitate the process. These were again not easily accessible under open licenses.

Notwithstanding the limitations, a significant advantage of ICT and contemporary generative AI tools is that they provide solutions to the majority of issues listed above (Bhadauria & Sharma, in press). For instance, the open videos could be downloaded and transcribed for subtitles using online tools. It also provided numerous opportunities for resource creation. H5P (HTML5 package), being a free open-source software, emerged as one such significant tool that facilitates the construction of various digital interactives, such as interactive videos, books and course presentations. It enabled us to create interactive assessments such as quizzes and puzzles, as well as incorporate activities like clicking, dragging and dropping into the resources. Moreover, it does not necessitate that the resource authors possess coding expertise. The platform features an intuitive interface that enables users to choose the sort of resources to produce and incorporate interactions effortlessly through clicking, selecting and adding them to the resources being developed. This platform was extensively used in the development of resources for Social Science.

The non-availability or scarcity of locally relevant, openly licensed social science resources pushed the team from curation to creation, but creation itself was constrained by limited access to primary media under open licences. ICT and generative AI tools mitigated some of these constraints by enabling subtitling, transcription, and the construction of interactive elements through H5P. These experiences informed adaptive SoPs that encourage parallel tracks of curation and creation, systematic use of open repositories, and the integration of low-code tools to reduce technical barriers while maintaining pedagogical quality.

#### ***4.4 Issues with the subject-volume of the curriculum***

A significant issue associated with the subject is the extensive nature of its curriculum. The number of chapters in the Social Science textbooks for grades VIII, IX, and X is 24, 22, and 21, respectively. This was over twice the number of chapters in other subjects, which had 12 to 15 chapters. This, therefore, presented a significant challenge during the project, impacting various facets of the social science team's work. Due to the substantial volume of deliverables in Social Science, compared to other disciplines, along with the uniform deadlines across all subject groups, the team consistently operated under pressure and constrained timelines. Consequently, deadlines were achieved without extensive deliberations. The review would necessitate alterations to media files, compelling the team to re-evaluate the fundamental structure of the resource.

Moreover, the subject's nature provokes varied viewpoints, requiring extended dialogue among team members to achieve consensus. Additionally, individuals maintain diverging stances based on their ideology. This also affected the representation of the resources described and approved. The project was inherently collaborative, including various partners in the planning, curation, development, and final approval of the resources. The parties comprised the faculties of TISS and SME, the RAs, the RPs and the faculty from SCERT. Due to the involvement of many parties, they presented diverse perspectives and held varying concerns. For instance, the TISS faculty and SME expressed concerns regarding the quality and pedagogy of the resources, while the RPS and SCERT faculty focused on the political acceptability and social desirability of the resources. RPs emphasised the alignment of the resources with practical teaching methods, referred to as "ground realities." Additionally, RAs, apart from pedagogical considerations, were primarily concerned with the technological feasibility of resource development. In this scenario, the establishment of any resources necessitated the presence of all parties during planning and reviews, as the primary objective prior to commencing work was to attain mutual consensus, achievable solely through discussions,

negotiations, and agreements on non-negotiables.

The meetings and discussions throughout the planning phase were essential, as the finalisation of each OER necessitated the permission of all participants, excluding the RAs, who were tasked with resource generation. Moreover, school teachers faced limitations owing to the restricted time allocated to finish the syllabus and desired that the content in the resources be confined to that found in the textbooks without extending beyond. Secondly, following the completion of the RAs' search, a subsequent conversation was necessary to conceptualise the OERs, specifically about the integration of the available resources to construct the lesson plan. Alternatively, in instances of total resource unavailability, a discourse on altering the already finalised topic may be warranted. Finally, once a draft or the entire resource is completed, a review and negotiation process is necessary to determine what to retain and what to eliminate, aiming for a mutual consensus among all parties, each of whom must compromise to some degree to satisfy the non-negotiables of others. All discussions were mandated to occur in the presence of all parties concerned. The insufficient time did not allow for discussions and dialogue essential for devising creative solutions to the diverse challenges. The project successfully brought together a team of highly skilled individuals from diverse areas of education. The faculties, SME, and the RPs possessed profound expertise and practical ideas that could not be adequately exchanged or digested. Numerous excellent ideas could not be implemented; testing was precluded by the stringent deadline and the substantial workload. Numerous concepts remained unarticulated, leaving everyone with plenty to convey.

The high curricular load, combined with uniform deadlines and multi-actor decision-making, created persistent time pressure and limited opportunities for iterative design and piloting. Divergent priorities among TISS faculty, SME, RPs, and SCERT further complicated consensus-building. These conditions underscored the need for adaptive SoPs that structure review cycles, clarify decision rights, and create space for negotiated compromise without derailing timelines. They also highlight the importance of early agreement on non-negotiables (e.g., alignment with textbooks, RAP indicators, constitutional values) to reduce later-stage renegotiation.

## **5. Visualising Learnings through Systems Approach: Drawing from Iceberg Model of System Thinking**

Upon reflecting back on the major events, processes, procedures, key turning points, decision and overall outcomes of the project, we argue that the entire project reveals for us the Iceberg model of

systemic learning (with definite event being occurred with its peculiar patterns of behaviour, system structures and mental models) getting mapped to different aspects of our journey.

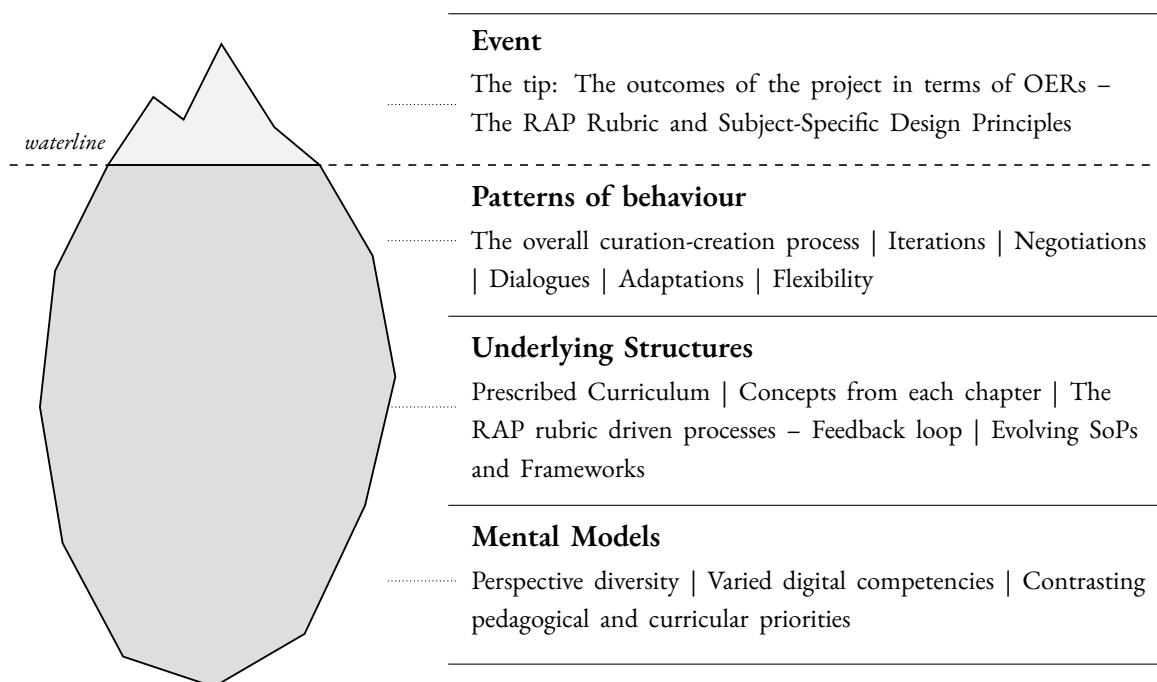


**Figure 2.** The Iceberg Model of System Thinking

### 5.1 Events

At the “Events” layer are the visible outcomes of the project: more than 500 OERs curated or created for grades 8–10, deployed on IFPs in over 4,000 government schools, and made available on the institute’s website; the public release of the RAP framework under the Policy and Practice Paper Series; and the formulation of subject-specific design principles for social sciences. These outcomes are the tip of the iceberg, readily observable and measurable. However, they are produced by deeper, less visible processes of negotiation, iteration, and adaptation.

### 5.2 Patterns

The “Patterns” layer captures recurring behaviours and processes beneath the visible outcomes. Key patterns include: the shift from curation to creation due to licensing and relevance constraints; repeated cycles of create–review–revise–quality check; sustained dialogue among TISS faculty, SME, RPs, and SCERT to resolve pedagogical, political, and technical concerns; and the gradual emergence of shared templates, review loops, and informal norms for collaboration. These patterns indicate that adaptive SoPs must institutionalise iteration and structured dialogue rather than as-

sume linear production. They also show that collaboration and communication are not ancillary activities but central mechanisms through which the system maintains coherence under pressure.

### ***5.3 Structures***

The “Structures” layer comprises the relatively stable arrangements within which the project operated. These include: the mandate to base OERs on SCERT textbooks for classes VII–IX; the pre-specified concepts within each chapter; the requirement to align all resources with the RAP rubric and subject-specific design principles; uniform deadlines across subjects; and the multi-actor governance structure involving TISS, SCERT, SME, RPs, RAs, and the QC Panel. These structural givens shaped the space within which adaptation was possible. They highlight the need for SoPs that work within policy and curricular constraints while allowing flexibility in resource design, review, and implementation.

### ***5.4 Mental Models***

The “Mental Models” layer includes the often tacit beliefs, assumptions, and orientations that influenced decisions and interactions. These encompass: differing views on what constitutes “good” social science content; assumptions about the role of technology in teaching and learning; beliefs about learners’ capacities and contexts; orientations towards openness, authority, and curriculum; and varying priorities regarding pedagogical quality, political acceptability, and ground-level feasibility. The presence of divergent mental models underscores the importance of SoPs that explicitly address perspective, representation, and negotiated consensus. It also suggests that periodic orientation to shared goals and principles can help align mental models without erasing productive diversity.

Together, the four layers of the Iceberg Model reveal OER development as a multi-layered system in which visible outputs are sustained by deeper patterns, structures, and mental models. The adaptive SoPs presented in the next section can be understood as codified responses to these systemic dynamics.

## **6. Results from Reflection: Adaptive SoPs for OER development**

Our experiences of navigating through the entire journey of OER development (from curation to creation), when reflected upon and analysed through the systems approach, and articulated using

the Iceberg model, allow us to delineate systemic and adaptive SoPs that evolved during the project processes in an iterative fashion. This is represented in Table 1 below:

**Table 1.** Adaptive SoPs for OER Development

| Steps           | Task                                                    | Activities within the task                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>STEP I</b>   | Define the scope of the project                         | <ul style="list-style-type: none"> <li>• Articulate broader educational objectives, mapping them to curriculum in place (state/board, etc.)</li> <li>• Identify targeted subjects (grades, geo-socio-linguistic context)</li> <li>• Enlist stakeholders (Government Department(s), Knowledge Partners, Experts, ICT support entities, etc.)</li> <li>• Ascertain technological infrastructure; determine tools, including hardware and software</li> </ul>                                       |
| <b>STEP II</b>  | Conduct a Needs Assessment                              | <ul style="list-style-type: none"> <li>• Understand the classroom realities and learning requirements.</li> <li>• Assess infrastructural support and Evaluate available resources</li> <li>• Estimate technological affordances and identify limitations (systemic and structural)</li> </ul>                                                                                                                                                                                                    |
| <b>STEP III</b> | Orient the teams and Introduce RAP rubric               | <ul style="list-style-type: none"> <li>• Conduct intensive inception and orientation workshops</li> <li>• Familiarise teams with the findings of needs assessment</li> <li>• If needs, formulate a context-specific rubric on RAP rubric</li> <li>• Discuss, Deliberate, Draw and Draft Plan of Action</li> <li>• Distribute and delegate roles and responsibilities</li> </ul>                                                                                                                  |
| <b>STEP IV</b>  | Commence Content and Resource Curation                  | <ul style="list-style-type: none"> <li>• Form needs-based small teams and designate roles and responsibilities</li> <li>• Wherever feasible, begin with curation of available OER</li> <li>• If required, adapt to creation when licensing or other constraints arise</li> <li>• Build multistakeholder (inter-disciplinary and inter-institutional) review, feedback and quality assurance mechanisms</li> <li>• Leverage on digital collaborative tools and communication platforms</li> </ul> |
| <b>STEP V</b>   | Employ Reflection-Analysis Loop – Develop internal SoPs | <ul style="list-style-type: none"> <li>• Conduct regular reviews and reflection sessions</li> <li>• Share and discuss each other's experiences</li> <li>• Document patterns and emerging trends – codify best practices</li> <li>• Specify instructions for distinct scenarios (pathways pattern for various dichotomies) and spell out procedures</li> <li>• Assess stakeholders' roles – If required, redefine and re-delegate responsibilities</li> </ul>                                     |
| <b>STEP VI</b>  | Undertake capacity and competency building initiatives  | <ul style="list-style-type: none"> <li>• Conduct periodic Competency building workshops/sessions for teams</li> <li>• Encourage participation and open communication through dialogues – Promote collaboration and adaptations</li> <li>• Build Community of Practitioners (CoPs)</li> </ul>                                                                                                                                                                                                     |
| <b>STEP VII</b> | Pilot Testing                                           | <ul style="list-style-type: none"> <li>• Test OERs in select schools/institutes</li> <li>• Observe processes, functioning, classroom environment – check accessibility and engagement challenges – feed into reflective loop – Improve and Re-test</li> </ul>                                                                                                                                                                                                                                    |

*continued on next page*

Table 1. (continued)

| Steps            | Task                      | Activities within the task                                                                                                                                                                                                                                               |
|------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>STEP VIII</b> | Institutionalise Learning | <ul style="list-style-type: none"> <li>• Revisit processes and procedures – underline iterations – underline adaptations and changes – analyse systematically – draw learnings</li> <li>• Update SoPs</li> <li>• Share insights and protocols for scalability</li> </ul> |

The following eight-step framework summarises the adaptive SoPs that emerged iteratively during the project. These SoPs are not fixed protocols but flexible heuristics designed to support structured adaptation in resource-constrained, multi-actor education systems.

Several features of this framework reflect the systemic dynamics identified through the Iceberg Model:

- Parallel curation and creation tracks (Step IV): Recognises that openness is negotiated and that licensing constraints may require shifting from curation to creation without derailing timelines.
- Multi-stakeholder review and quality assurance (Step IV): Institutionalises structured dialogue among pedagogical, technical, and political stakeholders to address divergent mental models and priorities.
- Reflection-analysis loop (Step V): Codifies the pattern of iterative review, revision, and consensus-building that characterised the project's behaviour over time.
- Capacity building and Communities of Practice (Step VI): Responds to the need for continuous professional development and alignment of mental models among diverse actors.
- Pilot testing and re-testing (Step VII): Introduces a structured mechanism for connecting resource design to classroom realities, even when direct evidence was limited in this project.
- Institutionalising learning (Step VIII): Ensures that adaptive SoPs are updated and shared, enabling scalability and contextual adaptation in other settings.

While derived from a specific state-led initiative in Telangana, these SoPs are intended as transferable heuristics. Their application in other contexts will require contextual adaptation rather than direct replication. State education departments, teacher education institutions, and EdTech organisations can use this framework as a starting point for designing their own adaptive procedures, aligned with local curricular mandates, infrastructural conditions, and epistemic priorities.

## 7. Discussion

The systematic reflective analysis of our experience of developing OERs for Social Science, using ethno-analytical reflection and systems approach, reveals that OER curation and creation isn't a linear process; rather, it is a learning oriented dynamic system. It is a system which is complex, multifaceted and layered with intentions and expectations of various stakeholders. It is governed by larger policies and regulation frameworks on one hand and context-specific factors on the other. It is further tightly coupled with pedagogical considerations and technological know-how. A systematic articulation of our learnings from this project based on the iceberg model using systems-thinking offer an Eight Step SoP for undertaking and navigating OER development. It enumerates pathways for meticulous planning, execution and evaluation of OER development structures and processes. Within it, there are possibilities of wide-scale adoption of the RAP rubric in state-led educational digital content policies. It being adaptive in nature promotes context-specific OER development processes. Thus, what we have here is a System, extracted in a form of a SoP, as a source of learning model for OER curation and creation.

The following subsections synthesise the key insights from the analysis and clarify the paper's conceptual and practical contributions.

### *7.1 OER development as systemic practice*

The project experience confirms that OER development in state systems is not a linear content-production exercise. It is a socio-technical process involving institutions, actors, workflows, technologies, and assumptions. The shift from curation to creation, the repeated review cycles, and the need for sustained dialogue among diverse stakeholders all point to OER development as a system that produces its own patterns of behaviour over time (Meadows, 2008). Adaptive SoPs provide a mechanism for coordinating these elements while allowing for contextual flexibility. They function not as rigid protocols but as structured heuristics that help actors navigate infrastructural constraints, licensing ambiguities, curricular mandates, and epistemic sensitivities.

### *7.2 Openness as negotiated practice*

The open/close dichotomy proved inadequate in practice. Licensing constraints, political sensitivities, and infrastructural limitations required the team to treat openness as a negotiated and staged process. Resources that were educationally valuable were often unusable due to licensing restric-

tions, while openly licensed materials sometimes lacked contextual relevance or offline accessibility. This tension indicates that state-led OER initiatives cannot rely on a binary distinction between open and closed resources. Instead, they require procedural mechanisms—such as staged rights review, parallel curation and creation tracks, and flexible licensing pathways—that treat openness as context-sensitive and evolving. The adaptive SoPs related to resource selection, adaptation, and creation reflect this understanding.

### *7.3 Social science OERs as epistemically situated*

The normative and interpretive nature of social science necessitates explicit procedures for reviewing representation, perspective, and values. In the project, this manifested in extended deliberations over which narratives, images, and examples were appropriate, and in the need to balance academic rigour with political and social acceptability. The subject-specific design principles (mapping and visualisation, multiple perspectives, recognition and inclusion, multidisciplinary approach, analysis and reflection, active citizenship and constitutional values) operationalised these epistemic requirements within the OER design process. The adaptive SoPs that institutionalise multi-perspective review, consensus-building among diverse stakeholders, and explicit attention to constitutional values and local contexts are direct responses to these epistemic features of social science.

### *7.4 Implications for stakeholders*

The insights from this project have implications for multiple stakeholders in state-led digital education initiatives.

- **State education departments and SCERTs:** The paper suggests embedding adaptive SoPs into digital content policies rather than relying solely on fixed production workflows. This includes institutionalising rights review at multiple stages, allowing for parallel curation and creation tracks, and building in structured review and feedback loops. The RAP rubric and subject-specific design principles can be adapted as quality assurance tools within state content development frameworks.
- **Teacher education institutions:** The experience highlights the value of communities of practice and continuous professional development for OER developers, teacher educators, and resource persons. Periodic orientation to shared goals, principles, and underlying structures can help align diverse mental models and improve coordination.

- **OER developers and EdTech organisations:** The findings underscore the need for flexible, context-sensitive design processes that account for infrastructural variability, linguistic diversity, and epistemic sensitivity. Low-code tools such as H5P, combined with generative AI for subtitling and transcription, can reduce technical barriers while maintaining pedagogical quality.
- **Researchers and evaluators:** The paper contributes a systemic, practice-informed conceptual account that complements empirical studies of OER use and impact. Future work could build on this by examining how adaptive SoPs are enacted in different contexts and how they influence resource quality, teacher use, and student engagement.

## 8. Limitations

This paper is positioned as a practice-informed conceptual account of OER development as a system, rather than an evaluative study of classroom implementation or learning outcomes. The analysis draws primarily on project documentation, meeting records, reflective journals, and the authors' experiences as designers and facilitators of the initiative. Direct evidence from classroom observations, teacher use, or learner interactions was limited and is not the focus of this paper.

Consequently, the claims made here concern the design, coordination, and systemic negotiation of OER development in a resource-constrained, multi-actor education system. They do not address the effectiveness of the OERs in improving teaching practices or student learning. The adaptive SoPs presented in this paper should therefore be understood as systemic heuristics for planning and managing OER development processes, not as evidence-based prescriptions for classroom impact.

Researchers working in this area can take up empirical studies which could complement this work with systemic account of how these OERs are used in classrooms, how teachers adapt them in practice, and what effects they have on student engagement and learning outcomes. Such studies would provide an important complement to the conceptual and procedural contributions of this paper.

## 9. Conclusion

This paper has argued that developing social science OERs in resource-constrained state systems is not a linear process of content creation. It is a complex, multi-actor system shaped by institu-

tional mandates, infrastructural constraints, linguistic diversity, and the normative nature of social science. Using ethno-analytic reflection and a systems approach, we have shown how adaptive Standard Operating Procedures emerged in response to these conditions. The eight-step SoP framework and subject-specific design principles offer systemic heuristics for state education departments, teacher education institutions, and EdTech practitioners.

The paper's conceptual contribution lies in treating OER development as a system and articulating how events, patterns, structures, and mental models interact to shape resource design and implementation. Its practical contribution lies in codifying adaptive SoPs that can guide similar initiatives in other resource-constrained, multilingual, and politically sensitive contexts. While derived from a specific project in Telangana, these heuristics are intended to support context-sensitive adaptation rather than standardised replication.

Future work could complement this systemic account with empirical studies of classroom use and learning outcomes, as well as comparative analyses of adaptive SoPs across different state and national OER initiatives. Such work would deepen understanding of how systemic heuristics can be enacted in practice and how they influence resource quality, teacher use, and student engagement in diverse educational settings.

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