

Education Research Group presentation

Teacher Professional Learning Communities: a participatory resource creation approach to OER in Karnataka

April 2016

Abbreviations used

- FOSS - Free and Open Source (Software), also known as ‘open source’ software or ‘free software’
- FGD(s) - Focus Group discussion(s)
- ICT - Information and Communication Technologies (more specifically digital technologies)
- ITfC - IT for Change
- OER adoption- OER adoption is used throughout the report in a comprehensive manner, to include resource reuse, creation, revision, remixing and redistribution
- PLC – Professional Learning Community
- PRC-AR - **P**articipatory programme for **R**esource **C**reation - **A**ction **R**esearch.
- STF - Subject Teacher Forum program
- TPD - Teacher Professional Development

Background – Open Educational Resources (OER) and ROER4D

OER – a recent global movement in teaching-learning resources creation and availability

largely driven by institutions in developed countries (Global North), can therefore influence learning in hegemonic ways

ROER4D (Research on OER for development)

A multi-country research to understand OER adoption in the developing countries (Global South), across countries in Asia, Africa and South America

ROER4D research question

In what ways, and under what circumstances can the adoption of OER address the increasing demand for accessible, relevant, high-quality and affordable post-secondary education in the Global South?

Research sub-projects of ROER4D include:

Survey on OER adoption in Universities, Teachers attitudes to OER, Re-use of OER in curriculum development, Impact of OER use on Mathematics education

Literature review

OER can help reduce cost of learning materials. (Lane, 2008)

- Expand access to quality of materials for higher education. (Wiley, Green & Soares 2012)

Cultural factors impact OER use and adoption. (Ngimwa & Wilson, 2012)

- Actual adoption of OER seems marginal in the global South. (Thakrar, Zinn & Wolfenden, 2009 and Hatakka 2009)
- There is need to avoid a culture of dependency; African institutions must be more than consumers; they also need to be generators of new knowledge and the means of sharing that knowledge” Ngugi 2011:284.

Contextual OER

- How effective are OERs outside of the context they are created? Ferreira (2008)
- There is a risk that language barriers and cultural differences could consign less developed countries to the role of OER consumers rather than contributors to the expansion of knowledge. (Paul Albright 2006 p. 12)

Literature review

Can OER processes lead to Teacher Professional Development (TPD)?

Reduce teacher isolation

OER creation through collaborative design. Sapire and Reed (2011)

Processes of peer review, feedback to improve teacher capability. (Petrides, Jimes, Middleton-Detzner & Howell, 2010)

“Teachers’ engagement with OER has the potential to support enhanced teacher collaboration and curriculum development activities as well as information sharing about resources, practices, and teaching challenges by encouraging a shift in focus from materials production to mentorship and facilitation.” (Ossiannilsson & Creelman, 2012).

Work on the TESSA project in Sub-Saharan Africa has also indicated the value of collaboratively developing OER (Wolfenden, Buckler & Keraro 2012) and the possibilities of pedagogical change (Murphy & Wolfenden 2013).

IT for Change research

Participatory Resource Creation – Action Research

Sub-project of ROER4D, conducted by IT for Change in Karnataka

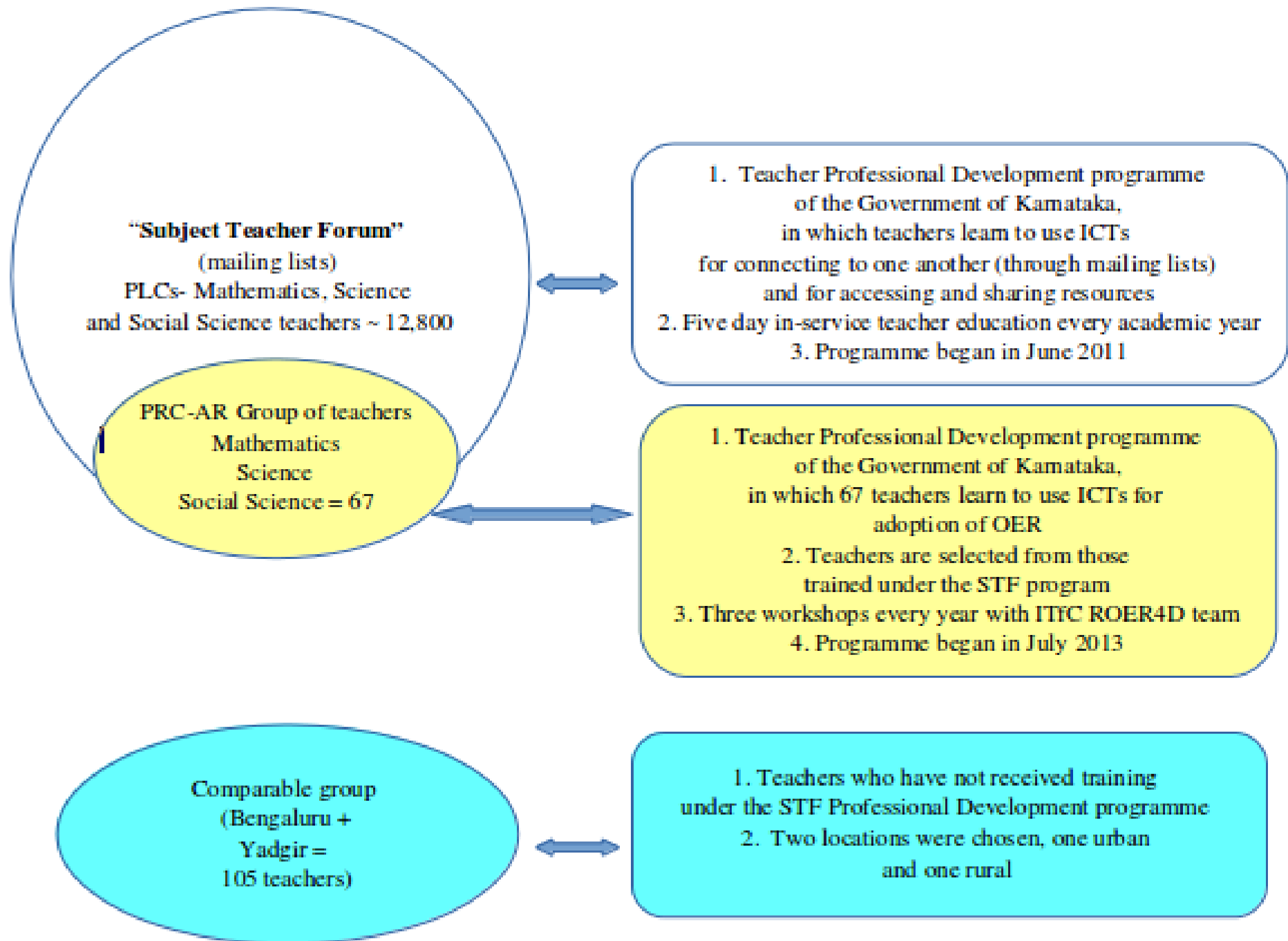
Whether and how, a bottom-up approach, where participants collaboratively and actively co-create contextual resources ('embedded' within a 'community of learning'), can support effective OER models

Action research with a group of 67 Mathematics, Science and Social Science Government High School teachers in Karnataka, who are part of a larger professional learning of teachers created by the 'Subject Teacher Forum' program

Research period - January 2014 to December 2015

Location – Karnataka state, India

Actors in the study



Context to the our research

Techno-social context

ICT program penetration high in high schools but actual availability poor
Teachers use of ICTs poor, outsourced model of implementation
proprietary software environment

Pedagogical context

Text book culture
Free supply of textbooks to all teachers and students
Teacher as a minor technician

Socio-cultural context

Linguistic diversity
Text books created at state level may not be able to address local contexts

Research objectives

whether teacher participation in OER creation has the potential to impact their

1. techno-social (expanding their use of digital methods),

2. techno-pedagogical (influencing their use of curricular resources and their pedagogies) and

3. socio-cultural (influencing their use of materials in local language and reflecting local culture) contexts and needs.

Framework for the research

Structuration theory (Anthony Giddens, 1984) adopted as the framework for the study

The Study

- Can a core group of teachers, (embedded in a professional learning community of teachers)
- participate in a TPD program on OER adoption, strengthening their agency?

And

- whether such participatory processes can influence
 - the techno-social structure
 - the techno-pedagogical structure
 - socio-cultural structure (in terms of contextual resources),
- enabling the emergence of a OER model
- in the education system in Karnataka, India.

Structure
and
Agency
(Impact of
structure
on agency at
beginning of the
research)

<p>Structure (contexts) – rules and resources in the public education system, Karnataka</p>
<p>Techno-social structure (digital contexts)</p> <p><u>Study context</u></p> <ul style="list-style-type: none"> - ICT infrastructure largely underutilized in school education - Teachers not familiar with digital methods - Proprietary software use dominant
<p>Techno-pedagogical (educational contexts)</p> <p><u>Study context</u></p> <ul style="list-style-type: none"> - "Textbook culture" - Teachers rely on text book largely, do not use other curricular resources - Centralized supply of uniform curricular resource materials - Limited availability of alternate curricular materials
<p>Socio-cultural</p> <p><u>Study context</u></p> <ul style="list-style-type: none"> - OER largely in English - Teacher isolation

Duality
of
Structure
And
Agency

<p>Agency</p> <p>Community of teachers collaborating, through the in-service TPD program:</p>
<p><u>Agency dialectic with techno-social structure</u></p> <ul style="list-style-type: none"> - Teachers' sense of irrelevance of digital technologies to their profession - Teachers' inhibition in using digital technologies - Lack of awareness about free and open technology environment
<p><u>Agency dialectic with techno-pedagogical structure</u></p> <ul style="list-style-type: none"> - Teachers' sense of being limited to textbook for their teaching; not finding any relevance or need for alternate resources - Teachers do not perceive themselves as creators of materials
<p><u>Agency dialectic with socio-cultural structure</u></p> <ul style="list-style-type: none"> - Teacher feel unable to reach out to their fraternity for support

Methodology

Mixed Method approach

Quantitative

- Closed ended questionnaire for participating teachers and comparable group of teachers
 - Demographic profile, Use of technology (computers and Internet), Teachers' need for information, ICTs for teaching
 - Socio-cultural aspects of OER (contextuality)
 - Awareness and access to OER / Learning Materials , Adoption of OER / Learning Materials
 - In what ways do teachers adapt, create,share/distribute OER / Learning Materials in their work
 - Networking for peer learning and sharing

Methodology

Qualitative

- Focus Group Discussions with PRC-AR teachers
 - Sharing beliefs and perspectives on OER, TPD and PLC
- Key Informant Interviews with teachers and officials
 - Factors favouring and constraining the development of an effective OER model based on PRC processes amongst teachers
- Mail analysis of the mails shared in the PLC forums / mailing lists
 - Reuse, creation, revision, remixing, re-distribution of resources by PRC-AR teachers in the PLC mailing lists
- KOER content analysis
 - Creation, and sharing of resources by PRC-AR teachers on the KOER wiki portal

Findings - Questionnaire

Questionnaire administered to PRC group and comparable group of teachers

Part 1 – To ascertain if the two groups are comparable

Age, academic qualifications, work experience, subjects taught of both groups similar.

Hence the groups are comparable.

Part 2- If the PRC-AR processes have impacted the PRC-AR teachers

Use of ICTs by PRC group significantly higher

Use of computers and Internet

Computers and Internet for fulfilling learning needs

Use of digital resources

Use of ICTs for preparing to teach and for teaching students

Adaptation of learning materials

Professional networking

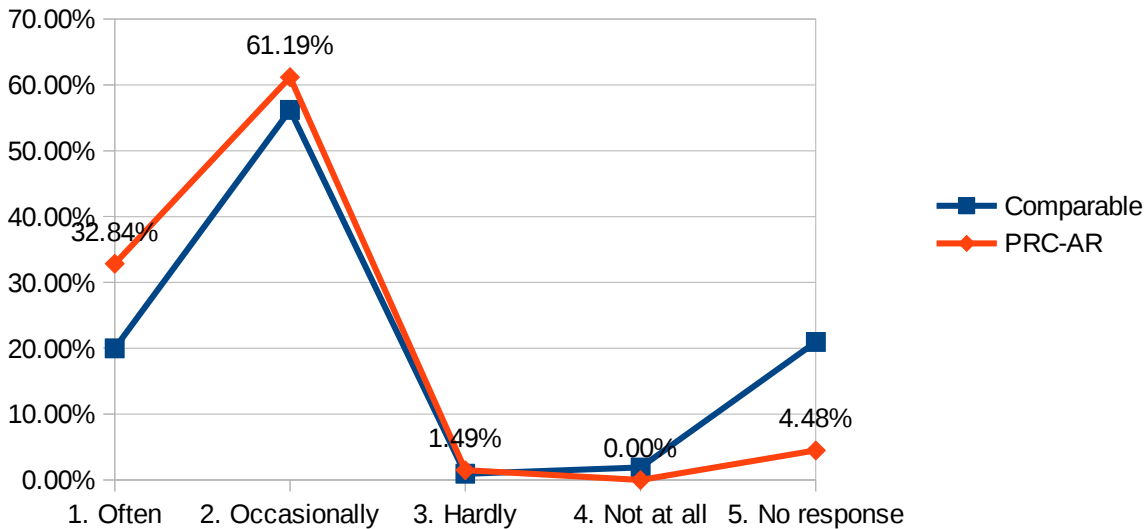
This suggests that the PRC processes have positively impacted the technology use, use of OER and teacher networking habits of the PRC-AR teachers

Usage of computers	Usage period (1-3years)	Percentage	Usage period (> 3 years)	Percentage
Comparable	0	0%	4	3.81%
PRC-AR	12	17.91%	44	65.67%

Usage of Internet	Usage period (1-3years)	Percentage	Usage period (> 3 years)	Percentage
Comparable	1	0.95 ⁵¹ %	3	2.86%
PRC-AR	9	13.437%	45	67.16%

Computers for fulfilling learning needs	Usage period (1-3years)	Percentage	Usage period (> 3 years)	Percentage
Comparable	0	0%	1	0.95%
PRC-AR	11	16.42%	34	50.75%

Frequency of use of additional learning materials



Findings – Questionnaire Comparison between PRC-AR and comparable groups

Use of ICTs for teaching students	Yes	Percentage	No	Percentage	No response	Percentage
Comparable	0	0%	47	44.76%	58	55.23%
PRC-AR	43	64.18%	5	7.46%	19	28.36%

Findings – Questionnaire Comparison between PRC-AR and comparable groups

Professional networking	Comparable	Percentage	PRC-AR	Percentage
Interaction with teachers in your school	13	12.38%	65	97%
Interaction with teachers in your <i>taluka</i> (block)	9	8.57%	65	97%
Interaction with teachers in your district	11	10.48%	64	95%
Interaction with teachers beyond your district	11	10.48%	55	82%

Table: Creating resources in collaboration with others

Comparable	Percentage	PRC-AR	Percentage
6	5.71%	50	74.63%

	Creating learning materials	Percentage	Sharing learning materials	Percentage
Comparable	62	59.05%	68	64.76%
PRC-AR	59	88.06%	65	97.01%

Findings – FGD and Key Informant Interviews

Resources must be free (i.e. at no or low cost) and open to revision for use in the classroom.

Resources should be available in local languages to be contextually relevant.

Resources also need to be relevant to what is being taught and learner levels and needs.

Resources can help to increase content knowledge, supplement textbooks and even increase (student) interest in the subject

Resources shared and learning undertaken through a PLC were valuable processes available to them to update their knowledge

The use of digital methods in OER adoption helped teachers to create resources in different formats, using different editors and tools learnt in the workshops, and also share it with their peers over the mailing-lists

Findings – Mail analysis

Month	PRC-AR (Mathematics and Science group)	Total PLC (Maths science group)
August 2014	142	1004
February 2015	56	2295
August 2015	298	3156
Total	496	6455

Mails in English and Kannada languages

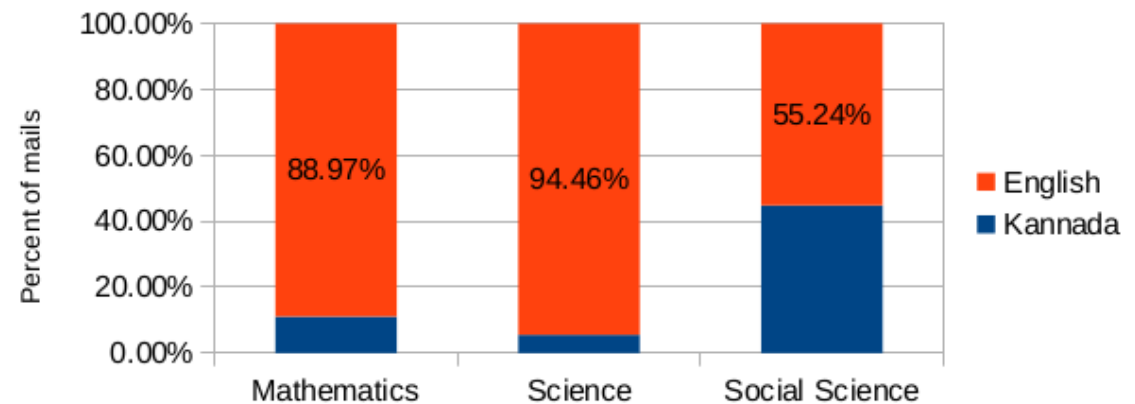


Table: Mails shared by PRC-AR teachers

Groups	PRC-AR	PLC members	Percentage	Mails shared by PRC-AR teachers	Total mails in the PLC mailing list	Percentage
Mathematics and Science	44	9,563	0.46%	3,397	50,264	6.76%
Social Science	23	3,319	0.69%	3,930	25,199	15.6%
Total	67	12,882	0.52%	7,327	75,463	9.7%

Analyses by type of mails

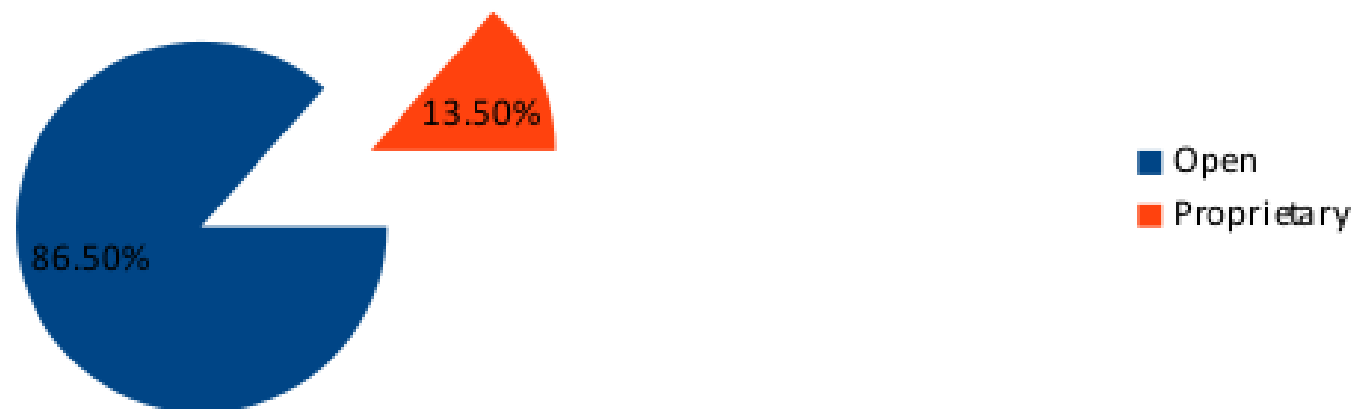
Focus area	Number	Percentage%
Count - Asking for help / seeking information or/ resources	21	4.57%
Count - Sharing resources – Reuse (including review comments)	56	12.20%
Count - Sharing resources – Created	102	22.22%
Count - Sharing resources – Revised	3	0.65%
Count - Sharing resources – Remixed	2	0.44%
Total mails	184	42.70%
Count - Others	275	59.91%
Total	459	100.00%

Analyses by OER processes

OER process	Number	Percentage
Count - Sharing resources – Accessed	56	34.43%
Count - Sharing resources – Created (incl specific resource ideas)	102	62.58%
Count - Sharing resources – Revised	3	1.84%
Count - Sharing resources – Remixed	2	1.23%
Total (also same as Re-distribute)	163	100.00%

Analyses by type of OER and formats

Nature of resource based on copyright	Number	Percentage
Explicit non-OERs	3	1.84%
Implicit non-OERs	0	0.00%
Implicit OERs	144	88.34%
Explicit OERs	16	9.82%
Total	163	100.00%



Findings - KOER content - summary statistics

KOER analytics	English KOER	Kannada KOER	Ratio of Kannada to English
Total web page views	1.67 million+	0.65 million+	38.92
Web pages created	4,400+	3,000+	68.18
Resource files uploaded	2,500+	1,500+	60.00
Users/ editors	285	346	121.40
	English Wikipedia	Kannada Wikipedia	
Number of articles	4.9 million+	16 500+	0.34

Subject	Number of resource pages created	Concept maps	Additional web links from the Internet	Audios/ videos/ images	Text materials (lesson plans)	Simulations/ animations (Geogebra)
Mathematics (English)	39	24	22	18	23	8
Science (English)	56	21	25	23	16	4
Mathematics (Kannada)	42	9	7	6	5	2
Science (Kannada)	51	21	14	44	15	1

Analyses - Impact of programme on the techno-social structure

1. Systemic integration of ICTs into TPD and resource creation programmes of the Education Department

Teacher training program conducted in ICT Labs in state and districts

Materials created and shared on digital networks

2. Capacity building for handling digital technologies and building agency.

Purchase of personal devices

Installation of FOSS operating system bundled with educational tools

'I want to buy laptop' and 'frequently asked questions' on the KOER portal

3. Creating a free and open environment.

Connecting public software and public education

Multiple tools learnt and used for resource creation

Resources in multiple (open) formats shared

Challenges

ICT infrastructure maintenance and availability still inadequate

Comfort and competence in use of ICTs, a time consuming process for many

Analyses- Impact of programme on the Techno-pedagogic structures

- PRC– AR processes enable creating and sharing resources
 - Design of resources
 - Being able to contribute in smaller units and sharing/ accessing
 - Possibilities of remixing multiple formats of resources (made possible in a Mediawiki platform)
- Impact of OER processes on TPD
 - PRC group teachers reported far greater engagement with resource adoption than comparable group
 - Reported higher use of additional materials
 - Their conception of what is a resource has changed – documenting activities, processes and sharing
 - Questioning the textbook culture
 - Combining methods and formats and sharing
 - Recording of a mapping lesson
 - Digitizing in different ways and sharing

Techno-pedagogic structures – Teacher Agency

- Influence of the interactions between the PRCAR group and PLC on TPD
 - The mailing lists have emerged as spaces where teachers are taking ownership, self-regulating their conversations and moderating interactions.
 - Within this context, the teacher community is responding to the various needs and priorities of teachers in terms of classroom resources and materials, and many contentious issues are publicly debated.
 - The mailing groups operate as ‘always available’ spaces for teachers to raise issues they consider important. Gidden’s assertion “mediated contacts that permit some of the intimacies of co-presence are made possible in the modern era by electronic Communication")
 - Such any time, anywhere possibilities of “co-presence” has implications for supporting collective agency of the members.

Impact on the socio-cultural structure

1. 'Implicit' OER in the Indian public school system context

Teachers intend to share for review and revision and re-use but do not explicitly state open license

2. OER creation in the local language

Kannada Wikipedia is 0.34% of English Wikipedia; FOR KOER it is 68%

3. Response to learner socio-cultural context

Creation of 'foundation' materials in Mathematics and Kannada

Structure and Agency (Impact of agency on structure at end of the research)

Structure (contexts) – rules and resources in the public education system, Karnataka at the end of the action research period

Techno-social structure (digital contexts)

Study context

- Integration of ICT infrastructure for TPD in the education department
- Teachers familiarity with digital methods and capability to integrate digital technologies
- Free and open digital environment

**Duality
of
Structure
And
Agency**

Teacher Agency as a result of the PRC-AR processes- community of teachers learning and collaborating, through the in-service TPD programme

Agency dialectic with techno-social structure

- Teacher capacities developed to interact with the digital environment and build an awareness of the possibilities of the digital in OER adoption processes, and demand a technology rich environment.
- Demand created for ICT infrastructure uptime by teachers, in the schools and in the education system
- Free and open digital environment created, so that teachers can freely access and share digital resources (software and content)

Structure and Agency (Impact of agency on structure at end of the research)

Techno-pedagogical (educational contexts)

Study context

Teachers open to considering OER in teaching, as an alternative to text book culture

Teachers open to considering OER adoption as part of TPD

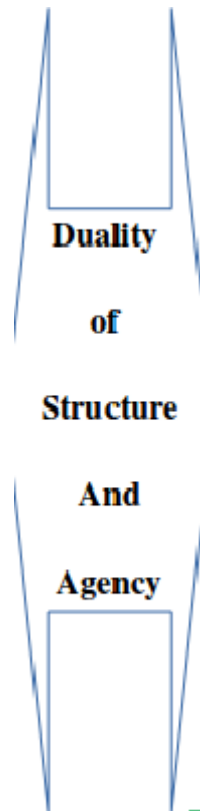
Teachers willingness to collaborate to create and share OER

Socio-cultural

Study context

- Contextual OER are available in Kannada and teachers are able to create OER in Kannada

- Teacher networks supporting peer learning and collaboration



Agency dialectic with techno-pedagogical structure

- Teachers willingness and abilities to access, create and share multiple OER that can extend the textbook

- Teacher capacities to collaborate in networks to share their experiences and resources; creating an environment of self-learning and peer-learning, that supports TPD

Agency dialectic with socio-cultural structure

- Teacher capacities developed to create materials in local language, relevant to the learner's context

- Teacher networks created to enable peer support

Conclusion

Participatory resource creation, a model for teacher professional development and OER adoption

Next phase of research

Use of OER in classroom processes

Study of the PLC interactions

Adapting the program in other states to refine the model

Policy required to actively support a free and open technology environment, which would include support for OER