DSpace Digital Library transformation to Collaborative Knowledge Hub
Agenda

1. **About dais & Krishikosh**
   1. Opening notes - Lyrasis
   2. Introduction - Speaker
   3. Krishikosh overview

2. **World we were living in and Covid19**
   1. Conventional engagement method
   2. Mitigation strategy due to Covid19 crisis
   3. Challenges faced…

3. **Let’s give a fresh look to DSpace**
   1. DSpace looked as IR conventionally
   2. DSpace as Knowledge Hub
   3. Phased approach and its advantages

4. **Other possibilities on DSpace and About DSquare Technologies**
Executive Summary

1. Conventional education system has gone through **paradigm shift due to pandemic**
   - Adopted Virtual Classes (Remote meetings)
   - Digital repository for study material
   - In person peers interaction switched to digital chats

2. **Challenges emerged** for students and institutions
   - Multiple parallel tracks for learning (Video Conf., Learning Management, Digital Library)
   - Limitation in frequent consultation
   - Need to refer multiple applications
   - All of above results in difficulty in developing context

3. DSpace as a Knowledge Hub rather than a Digital Library
   - Single point for all Learning material, recordings and other contents
   - Accessing Lectures recordings, corresponding study material and peer exchange on content in single window
   - Collaborative environment enabling teachers and students exchanging thoughts and generating knowledge
   - Innovative tweaks for keeping cost of ownership low
About Speakers

Dr. Amrender Kumar Jha
Principal Scientist (Agricultural Statistics)
Agricultural Knowledge Management Unit (AKMU), Indian Agricultural Research Institute (IARI)

Program Head – Krishikosh (Central Knowledge Bank for Agricultural Contents)

DSquare Technologies (DuraSpace Registered Service Provider and Contributor)
Partner in ideation, implementation and maintaining Krishikosh
About Krishikosh

Krishikosh was founded in **May, 2009** as an **Open Access Initiative** providing platform to Agricultural Institutes to host its contents.

- **90** Member Institutions
- **201k** Items / **~40 Million** Pages stored\(^1\)
- **~19 Million** visits from **178** countries until now... \(^2\)
- **5** Top visitor countries respectively...
  - USA
  - India
  - China
  - Russia
  - Philippines

\(^1\) Count as on April 27\(^{th}\) 2020
\(^2\) Count as on April 27\(^{th}\) 2020 as per Google Analytics
Conventional way and pandemic effect
World we were living in...

In Campus activities

Physical Library

Teachers / Faculty

Fellow Group

Digital resources

Access to Study contents

Digital Library

Learning Management System

External Resources

Contextual Knowledge

In person consultation / Collaborative working with fellow students

Classroom consultation Frequent follow up discussions

Student(s)

1 In person activities within campus/institution

Highlights

1. Students accessing contents from in campus libraries & Digital resources

2. Gaining contextual understanding of contents using
   a. Classroom sessions
   b. In-person follow up discussions
   c. Collaborative working with fellow students
Conventional way and pandemic effect
Best possible mitigation measures adopted by institutions...

In Campus activities managed virtually

Digital resources

Changes adopted as mitigation strategy

1. Virtual meeting platforms like Zoom / Webex / Skype etc. for classroom sessions
2. Fellow students collaboration via Skype / WhatsApp / Zoom etc. platforms
3. Corresponding contents accessed from independent content repositories
4. Courses / contents hosted on learning management portal
5. Assignments / work submission via independent E Mails / learning management portal
Conventional way and pandemic effect
...that came with some challenges for students and faculties

Key challenges faced...

1. Difficulty in developing context due to zero relationship between contents, lectures and other related items
2. Limitation in frequent consultation with faculty due to remote engagement
3. Users need to refer multiple applications for accessing various contents
4. Approach lacks ability of converting contents into knowledge for long term benefits
Lets give a fresh look to DSpace

DSpace as we all know – an Institutional Repository

Security
1. User based access control
2. Storage hierarchy based access
3. Request a copy option for restricted items

Capture
1. Document submission using maker – checker workflow
2. Import of multiple file types
3. Custom metadata during capture

Integration
1. Open Rest APIs
2. OOTB integration with other open source solutions

Metadata
1. Provision of custom metadata
2. Community, collection, Item level indexing
3. Full Text indexing

Platform
1. Java based solution
2. Windows, Linux, Unix OS Support
3. PostgreSQL / Oracle RDBMS
4. Compatible with multiple browsers

Store
1. Configurable Taxonomy
2. Organization specific Taxonomy
3. Nonproprietary format for backend content storage

Distribute
1. Accessibility from multiple platforms
2. Item level unique URI for sharing

Search
1. Metadata & operators based Search
2. Phonic Search
3. Full Text Search
4. Faceted Search and Discovery
Let’s give a fresh look to DSpace
Let’s see DSpace again as a Collaborative Knowledge Hub

- **Capture**
  - Document submission using maker–checker workflow
  - Import of multiple file types
  - Document Type specific Metadata
  - Content push from other applications

- **Organize**
  - Custom Metadata
  - Configurable Taxonomy as per Institution’s needs
  - Nonproprietary format for backend content storage

- **Retrieve & Distribute**
  - Metadata & operators based Search
  - Full Text & Phonic Search
  - Discovery
  - Item level unique URI for sharing
  - Accessibility from multiple platforms

- **Collaborate & Referencing**
  - Content level comments by stakeholders with moderation module
  - Linking between contents
  - Content sharing with peers

- **Analytics & Reports**
  - Qualitative Analytics in terms of Rating & Comments
  - Quantitative Analytics – Trending Items, Searches, Geographical spread etc. at all levels.
  - Custom Reports

- **Enhanced utility with external integrations**
  - Document submission using maker–checker workflow
  - Import of multiple file types
  - Document Type specific Metadata
  - Content push from other applications

**Relevant Value Added Solutions**

- Open Source Business Intelligence
- YouTube integration for video storage
- Universal Viewer for 3D, Audio, Video & PDF viewing
- Controlled Vocabulary & Thesaurus Solution
- Learning Management System
- Multi lingual Batch PDF OCR solution
- Automated Keywords extraction
- CKAN Data Portal
- YouTube integration for video storage
- Universal Viewer for 3D, Audio, Video & PDF viewing
- Controlled Vocabulary & Thesaurus Solution
- Learning Management System
- Multi lingual Batch PDF OCR solution
- Automated Keywords extraction
- CKAN Data Portal
- Relevant Value Added Solutions

**Additional Features**

- Qualitative Analytics in terms of Rating & Comments
- Quantitative Analytics – Trending Items, Searches, Geographical spread etc. at all levels.
- Custom Reports

**Open Source Business Intelligence**

- YouTube integration for video storage
- Universal Viewer for 3D, Audio, Video & PDF viewing
- Controlled Vocabulary & Thesaurus Solution
- Learning Management System
- Multi lingual Batch PDF OCR solution
- Automated Keywords extraction
- CKAN Data Portal
- Relevant Value Added Solutions

**Language Support**

- Multi lingual Batch PDF OCR solution
- Automated Keywords extraction
- CKAN Data Portal
- Relevant Value Added Solutions

**Education & Training**

- YouTube integration for video storage
- Universal Viewer for 3D, Audio, Video & PDF viewing
- Controlled Vocabulary & Thesaurus Solution
- Learning Management System
- Multi lingual Batch PDF OCR solution
- Automated Keywords extraction
- CKAN Data Portal
- Relevant Value Added Solutions

**Technical Support**

- YouTube integration for video storage
- Universal Viewer for 3D, Audio, Video & PDF viewing
- Controlled Vocabulary & Thesaurus Solution
- Learning Management System
- Multi lingual Batch PDF OCR solution
- Automated Keywords extraction
- CKAN Data Portal
- Relevant Value Added Solutions

**Accessibility**

- YouTube integration for video storage
- Universal Viewer for 3D, Audio, Video & PDF viewing
- Controlled Vocabulary & Thesaurus Solution
- Learning Management System
- Multi lingual Batch PDF OCR solution
- Automated Keywords extraction
- CKAN Data Portal
- Relevant Value Added Solutions

**Documentation & Manuals**

- YouTube integration for video storage
- Universal Viewer for 3D, Audio, Video & PDF viewing
- Controlled Vocabulary & Thesaurus Solution
- Learning Management System
- Multi lingual Batch PDF OCR solution
- Automated Keywords extraction
- CKAN Data Portal
- Relevant Value Added Solutions
Lets give a fresh look to DSpace
Rapid tweaks for mitigating immediate challenges

DSpace Ecosystem as Central Knowledge Hub

Phase 1 – Rapid Deployment

DSpace as central Knowledge Hub for all contents

- Internal contents stored in DSpace
- Linking performed between Session recording, internal and External contents
- Recorded lectures stored on YouTube / DSpace storage in backend.
- Peer group collaborating via comments on same content.
- Integration with Learning Mgmt Sys.
- Analytics & Ratings
- GDPR & OWASP Compliance

YouTube/On premise Media storage for backend storage of video recordings

Institution’s DSpace Storage

OR

Institution’s DSpace Storage

Universal Viewer for 3D, Audio, Video & PDF viewing

Single Window access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

DSpace as central Knowledge Hub for all contents

Learning Management System

Accessing Learning Management System

Virtual Classes

Teachers / Faculty

Student(s)

Fellow Group

Phase 1 – Rapid Deployment
Lets give a fresh look to DSpace
Further enhancement with complementary solutions

DSpace Ecosystem as Central Knowledge Hub

Phase 2 – Sustainable enhancements

- Configurable Controlled Vocabulary & Thesaurus Solution
- All&ML based Automated Keywords extraction
- Central BI/Data Visualization Solution

Phase 1 – Rapid Deployment

- Integrated with DSpace for Meta tag, search, recommendation etc.
- YouTube/On premise Media storage for backend storage of video recordings
- Institution’s DSpace Storage

DSpace as central Knowledge Hub for all contents

- Internal contents stored in DSpace
- Linking performed between Session recording, internal and External contents
- Recorded lectures stored on YouTube / DSpace storage in backend.
- Peer group collaborating via comments on same content.
- Integration with Learning Mgmt Sys.
- Analytics & Ratings
- GDPR & OWASP Compliance

Possibility of Connecting other solutions with Controlled Vocabulary / Automated Keyword extractor and Central BI Solution for usage expansion

Other IT Applications

Teachers / Faculty
Students
Fellow Group

Universal Viewer for 3D, Audio, Video & PDF viewing

Virtual Classes

Storage of Session Recording in DSpace

Accessing Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Other stakeholders

Teachers / Faculty
Students
Fellow Group

Teachers / Faculty
Students
Fellow Group

Virtual Classes

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR

Phase 1

Phase 2

Rapid Deployment

Sustainable enhancements

Universal Viewer

Single Winlow access of Linked Contents & Collaboration among Stakeholders via comments & Project Dossiers

Learning Management System

Re-usable content for LMS

Institution’s DSpace Storage

OR
Potential advantages of DSpace as Knowledge Hub…

1. Better context by referring all related contents together (course contents, lectures, external contents etc.)
2. Collaborative environment for Users to interact on contents
3. Phased approach for meeting immediate challenges and enhancing gradually
4. Sustainable and scalable model
5. Flexible approach as per our priorities
   a. Choice of media storage on free external media platform or internal storage
   b. Keep upgrading with complementing solutions
   c. On premise / Hosted solution
6. Benefits of complementary solutions
   a. Integrated controlled vocabulary help in organizing contents systematically and enhanced searching
   b. Keywords extraction solution help in converting data / information into knowledge
   c. Extending knowledge generated in DSpace to other applications
About DSquare...

DSquare Technologies has expertise in providing innovative solutions for Information Management & Processing on World known Open source platforms.

We help you in converting data & information into Knowledge.

Achievements

✓ Registered Service Provider & Contributor of DSpace
✓ 20+ deployments in multiple continents
✓ Managing 98 million plus pages for High Courts & Supreme Court of India
✓ Central Agricultural Knowledge bank in India
✓ Solution for Education, Govt., Corporate, Knowledge Management and many more...
✓ Vast addons, Capture solution, BI Solution and Process automation tools on open source. Well integrated with each other.

Technologies we work with...

- Production Document Capture workflow
- Multi lingual Batch PDF OCR solution
- DSpace Opensource Knowledge / Documents Management
- CKAN Data Portal
- Universal Viewer for 3D, Audio, Video & PDF viewing
- Controlled Vocabulary & Thesaurus Solution
- Superset – Business Intelligence solution
- Robotics Process Automation and Workflow Solution
- Automated Keywords / Key phrase extraction Solution

Our footprints...

...and Accreditations

Reach us at: sales@d2t.co | support@d2t.co | www.d2t.co
Few success stories on DSpace by DSquare Technologies
DSquare’s Offering
On DSpace platform

Solution for everyone...

1. **Document Management System** for Office and other Institutional records
2. Knowledge Portal for remote learning / Digital Library for Institutional repositories
3. DSpace for managing artifacts in Archives (Images, Audio, Video etc.)
4. DSpace for Hospital Records Management
5. Research Information System
6. DSpace to integrated with ERP, BPM and other IT systems of any institutions
7. Courts Records Management for case files management

And many other possibilities...

Some of unique Add-ons on top of Open source DSpace platform:

1. Modern UI with Mobile first approach
2. Real-time data analytics & Reports
3. Content Rating / User Comments modules
4. IP Range/Active Directory based access / subscription Module
5. Browser based content viewer
6. E-commerce solution
7. Enhanced Security: GDPR and OWASP Compliant
8. Digital Signature, Dynamic Watermarking and XMP Metadata embedding
9. Third party application integration
10. Add-hoc Workflow, version control, favorites.
# Target Markets & Business Model

<table>
<thead>
<tr>
<th>Education / Culture</th>
<th>Judiciary</th>
<th>Corporate</th>
<th>Federal</th>
<th>Healthcare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Portal for remote learning / Digital Library</td>
<td>Case files management</td>
<td>Office DMS</td>
<td>Public facing records portal</td>
<td>Medical Records Management</td>
</tr>
<tr>
<td>Artefacts Management Portal with E Commerce</td>
<td>DMS for law firms</td>
<td>Vendor Invoice portal</td>
<td>Internal Documents Management System</td>
<td></td>
</tr>
<tr>
<td>Research Information Management</td>
<td></td>
<td>Knowledge Bank</td>
<td>Knowledge Bank</td>
<td></td>
</tr>
<tr>
<td>Student Records Management</td>
<td></td>
<td>Tasks Automation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Administrative Records management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solution available in RTL in Arabic and LTR along with GDPR Compliance

## Business Model
1. Hosting / On-Premise
2. SaaS
3. Perpetuity
4. Co-branding
5. Box Products / Project based development
Appendix
Value added solutions
Controlled Vocabulary Solution

Overview

Controlled vocabulary is an organized arrangement of words and phrases used to index content and/or to retrieve content through browsing or searching. It typically includes preferred and variant terms and has a defined scope or describes a specific domain.

Automated Keywords extraction

Machine learning based automated keywords extraction on the basis of controlled vocabulary developed by Department.
In depth analysis of documents and extracting keywords on pre defined logics. Human intervention reduced for enhancing automated output.
## Value added solutions
### Controlled Vocabulary Solution

<table>
<thead>
<tr>
<th>Key Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Configurable Keywords / Key Phrase Vocabulary by authorized users.</td>
<td>1. Central solution for managing keywords for multiple DSpace instances</td>
</tr>
<tr>
<td>2. Provision of defining relationships between terms - Thesaurus / related /</td>
<td>2. Scalable model for keywords management</td>
</tr>
<tr>
<td>synonyms from other languages etc. for enhanced indexing/searching</td>
<td>3. Enabling business user to manage domain specific vocabulary and less</td>
</tr>
<tr>
<td></td>
<td>dependency on IT resources</td>
</tr>
<tr>
<td>3. Possibility of importing external vocabularies on standard SKOS/RDF</td>
<td>4. Uniformity in Keywords added by various users</td>
</tr>
<tr>
<td>standards</td>
<td>5. Enhanced analytics and conversion of data in knowledge</td>
</tr>
<tr>
<td></td>
<td>phrase extraction</td>
</tr>
<tr>
<td>5. Access control management and auditability of actions performed</td>
<td>7. Reusable dataset for future expansion in Machine learning and Artificial intelligence.</td>
</tr>
</tbody>
</table>
Value added solutions
Superset - Central Business Intelligence Solution

A modern, enterprise ready business intelligence web application.

1. Explore your data
2. Create interactive dashboard from multiple DSpace instances
3. Shareable and embeddable charts and dashboards
4. Configurable charts/dashboard
5. Access control management for defining roles
6. Expandable usage beyond DSpace’s databases
7. Support data visualization from ad hoc CSVs
8. More than 32 visualization types
9. SQL editor in browser for complex dashboard building by domain experts