<table>
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<td><strong>Author(s)</strong></td>
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Makerspace: The NIE Library Experience

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Outline

• Introduction
• Project Background
• Library as Space – Collaborative Space
• Makerspace
• Community Engagement
• Benefits
• Challenges
• Conclusion
Introduction To NIE

• Founded in 1950 as a library for the Teachers' Training College in Singapore.

• The Library provides resources to support the teaching, learning and research programmes of the Institute.

Introduction To NIE Library
Project Background

LIBRARY AS SPACE PROJECT (2011-2013)

- Renovated Staff offices
- Integrated Service Point
- RFID Conversion (2011)
- ECO-Friendly Lighting, Carpets & Materials

Level 2: Service Space

- 22% In Seating Capacity (747 Seats)
- 5 Learning PODS
- >300 Additional Power Points for devices

- NEW
  - GALLERY
  - RESEARCH COMMONS
  - DIGITAL INFORMATION DISPLAYS

- REFRESHED
  - CAFE
  - SMART ROOM
  - STAFF LOUNGE
  - LEARNING HUB LOUNGE

Self-check Machines
Free-standing bookdrop
24-hour bookdrop
One-stop Service Point
Touch Screen WebOPAC
Reserves (RedSpot, Circulating Media & Reference Materials)
Level 4 : Knowledge Space

Level 3 : Collaborative Space

- Discussion PODs
- Smart Room
- Lounge
- Gallery
- Makerspace
- Cafe
Makerspace

- Aspire to be a space where members share, collaborate and perform rapid prototyping of ideas
- In respond to paradigm shift towards higher order thinking skills
- Particularly relevant for NIE as there has been a substantial growth of makerspace in secondary schools

Software and Equipments in Makerspace

- MakerBot 3D Printer
- 3D Modeling & Printing in Progress
Community Engagement

Posters with diagrammatic explanations

How 3D Printing works

1. Original object
2. Object is digitised into 3D model either by scanning or 3D drawing
3. Software “slices” 3D model into layers. After that it will be sent to the printer.
4. Printer forms the object by depositing the material in layers, starting from the bottom.
5. Done!

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Community Engagement

Artefacts curated to achieve intuitive understanding

Easy to understand capabilities of 3D printing and its advantages

Parts printed separately and assembled as a whole
Item printed as a whole with movable parts
Community Engagement

Artefacts curated to achieve intuitive understanding

Easy to understand capabilities of 3D printing and its advantages

Item with curvatures

Object can be scaled to a small size

Flexible
Community Engagement

Artefacts curated to achieve intuitive understanding

Easy to understand capabilities of 3D printing and its advantages

Waterproof

Parts printed in different colours and assembled as a whole

Community Engagement

Showcase possibilities

Can have scaled model of design
Community Engagement

Showcase possibilities

Can produce practical designs for immediate use

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Community Engagement

Showcase possibilities

Can personalise your design. Containers need not be cuboid!
Community Engagement

Showcase possibilities

Can produce designs as one whole piece without any modular parts
Community Engagement

Publicity

Blog post
Corporate website
Newsletter

Community Engagement

Collaboration

Teaching aids for the teaching of lock and key model of enzyme reaction in biology
Provides a tactile experience to learning

Shortlisted Objects
Community Engagement

Collaboration

Teaching aids for the teaching of lock and key model of enzyme reaction in biology

Provides a tactile experience to learning

Bottom row: Scaled object printed first for evaluation
Top row: Object printed its in full size

Community Engagement

Collaboration

Partner with internal department and external vendor to conduct workshop
Community Engagement

Collaboration

Partner with internal department and external vendor to conduct workshop

Community Engagement

Adoption of Technology at Home

Vendor quoted price
SGD 85.00

Self printed cost
SGD 0.038
Community Engagement

Adoption of Technology at Home

Bookmarks as premiums during library fairs

Benefits

- Makerspace has become a focal point during library visits
- Additional channel to connect with users
- Provides equitable opportunity for users to gain access and exposure to technologies
- Exposure gained can help student teachers to promote likewise environment when they start teaching
- Opportunity for mindset change as library staff learn to offer new service
Challenges

- Budget constraints overcome by:
  - Achieving lower cost of investment by reusing furniture, display cabinets and computer
  - Restricting new purchase to 3D printer
  - Working with internal department to source for low-cost 3D printer
  - Minimised training costs by having library staff learn basic troubleshooting from internal department

Challenges

- Lack of technical skills overcome by:
  - Learn basic troubleshooting skills from internal department
  - Attend workshop conducted by internal department
  - Informal learning from Internet resources
Challenges

- Get buy-in from library staff:
- Interest staff in problem solving

- Provide opportunities for them to demonstrate creativity

Conclusion

- Look at ways to enhance makerspace:
- Explore working with academic staff
- Attract interest by providing low-cost, easy-to-complete DIY projects
Thank you