Achieving ICT Competency Standards for Teachers through 21st Century Learning Design

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Introduction

• **Aim of study:** To evaluate the intervention of 21CLD on UNESCO-ICT-Competency Framework for Teachers (UNESCO-ICT-CFT) in 3 Malaysian primary schools.

• Apart from that, the study shall introduce 21CLD into the teaching and learning process so that the students’ cognitive skills can be elevated to a higher level.

• **21st century skills** blend very well with the UNESCO-ICT-CFT to form an ideal teaching strategy.
Studies on ICT adoption and integration in teaching and learning are limited.

Andoh (2012): The Barriers for ICT implementation in education:

- Lack of teacher ICT skills, teacher confidence, pedagogical teacher training, suitable educational software.
- Limited access to ICT, rigid structure of traditional education systems, restrictive curricula.
Studies related to 21CLD & UNESCO-ICT-CFT

• Literature on studies related to 21CLD and UNESCO ICT-CFT are also lacking.

• Yusof & Balogun (2011), Badau & Sakiyu (2013):
  - Teachers lacked the necessary competence in the full integration of ICT in the curriculum.
  - There is a need to improve the ICT contents of teacher education programs and professional development programs in universities.

• This must be a priority for all countries (UNESCO Institute for Statistics, 2014).
ICT in education status quo in Malaysia

UNESCO Institute for Statistics 2014:

- Malaysia has a stand-alone, sector-wide ICT in education plan.
- Primary, lower secondary and upper secondary schools provides 11-20 instruction hours per week.
- Electricity in all schools.
- Telephone communication facilities: 88% of primary schools and 76% of secondary schools.
- Learner to computer ratio: 17:12:7 (Primary: Lower Secondary: Upper Secondary)
- ICT support services: Some schools face challenges to effectively maintain ICT systems infrastructure.
ICT in education status quo in Malaysia

• Connecting schools to support Internet-assisted Instruction: Connectivity in primary and secondary schools (90% vs 96%).

• Participation in ICT-assisted instructions (TAI, CAI, IAI): 100% enrolments for male & female at primary, lower and upper secondary schools.

• Basic computer skills for male & female students: Primary level (100% both), lower secondary (61% male, 62% female), upper secondary (24% male and 21% female)

• Percentage of students using computer in learning activities: Mathematics (less than 5%), Science (less than 20%)

• Teachers are universally trained to teach using ICT in their classrooms.
Research Questions

1. How competent are teachers, based on the ICT competency standards of UNESCO-ICT-CFT?

2. Are there any significant differences in ICT competency standards for teachers in urban and rural schools?

3. Are there any significant differences in teachers’ contribution to implement or modify ICT policy in urban and rural schools?
Methodology

- 3 Malaysian primary schools, 2 urban and 1 rural, selected.
- 130 teachers participated
- Methodology used: Survey questionnaire and focus group interview (analysis in progress)
- Quantitative and qualitative results are presented using descriptive statistics and developing a thematic framework.
Methodology

Stage 1: Evaluating level of ICT competency among teachers, using an adapted instrument based on the UNESCO ICT-CFT.

Stage 2: Creating awareness among the teachers of the latest developments on 21st century skills needed by students & the different levels of ICT competency required by teachers.

Stage 3: Assessing relationship between 21CLD and UNESCO-ICT-CFT.
Results and Discussion

• Analysis and evaluation of the available standards of teachers’ ICT competence level are presented:
• 130 teachers, 17 males, 113 females
• 1 Headmistress, 4 Assistant Headmistresses,
• 3 Subject Heads
• 119 ordinary teachers
• 2 pre-school teachers
• 1 other.
• Reliability: Cronbach’s Alpha 0.813
Distribution of teachers based on gender and geographical location
66.2% have more than 10 years experience. Most of them teach more than 1 subject throughout their service.
Frequency of using computer

89.1% use computer at least once a week
54.3% use computer daily
Teachers’ ICT Competence Level
## Teachers’ ICT competence level according to geographical location of schools

<table>
<thead>
<tr>
<th>ICT Competency Framework for Teachers</th>
<th>Rural (%)</th>
<th>Urban (%)</th>
<th>Overall (%)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Technology Literacy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Policy Awareness</td>
<td>57.8</td>
<td>42.2</td>
<td>54.8</td>
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<tr>
<td>Basic Knowledge</td>
<td>47.6</td>
<td>52.4</td>
<td>62.0</td>
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<tr>
<td>Integrate Technology</td>
<td>47.6</td>
<td>52.4</td>
<td>44.2</td>
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<tr>
<td>Basic Tools</td>
<td>71.1</td>
<td>28.9</td>
<td>68.1</td>
</tr>
<tr>
<td>Standard Classroom</td>
<td>31.0</td>
<td>69.0</td>
<td>30.3</td>
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<tr>
<td>Digital Literacy</td>
<td>52.6</td>
<td>47.4</td>
<td>54.2</td>
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<tr>
<td>Knowledge Deepening</td>
<td></td>
<td></td>
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<tr>
<td>Policy Understanding</td>
<td>80.5</td>
<td>19.5</td>
<td>78.9</td>
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<tr>
<td>Knowledge Application</td>
<td>42.2</td>
<td>57.8</td>
<td>49.5</td>
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<tr>
<td>Complex Problem Solving</td>
<td>40.5</td>
<td>59.5</td>
<td>44.1</td>
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<tr>
<td>Complex Tools</td>
<td>42.2</td>
<td>57.8</td>
<td>43.3</td>
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<tr>
<td>Collaborative Groups</td>
<td>27.6</td>
<td>72.4</td>
<td>43.1</td>
</tr>
<tr>
<td>Manage &amp; Guide</td>
<td>50.9</td>
<td>49.1</td>
<td>54.5</td>
</tr>
<tr>
<td>Policy Innovation</td>
<td>24.1</td>
<td>75.9</td>
<td>45.5</td>
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<tr>
<td>Knowledge Society Skills</td>
<td>58.6</td>
<td>41.4</td>
<td>64.5</td>
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<tr>
<td>Self Management</td>
<td>52.6</td>
<td>47.4</td>
<td>57.2</td>
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<tr>
<td>Pervasive Technology</td>
<td>34.5</td>
<td>65.5</td>
<td>28.7</td>
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<tr>
<td>Learning Organisations</td>
<td>43.1</td>
<td>56.9</td>
<td>53.2</td>
</tr>
<tr>
<td>Teacher as a Model Learner</td>
<td>28.3</td>
<td>71.7</td>
<td>26.9</td>
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</table>
Teachers’ ICT competence level

• Generally: Teachers from urban and rural schools are technologically literate, majority are aware of ICT policy introduced to their schools
• 58.8% good at the basic knowledge, 68.8% good at basic tools, 30.0% good at Pervasive Technology
• *Urban school teachers* better grasp of ICT basic knowledge (62.0% : 47.6%)
• Only 44.9% comfortable integrate technology into their lessons
• Only 30.5% actually use ICTs with their students in the classroom
• Due to: Limited mastery of ICT technology and skills
Teachers’ ICT competence level

• Both urban and rural school teachers have high level of understanding of ICT policy (78.9% vs 80.5%).

• Active in utilizing ICT in knowledge application: (Urban 49.5% vs rural 42.2%)

• Complex problem solving (44.1% vs 40.5%)

• Manage their professional learning and guide the colleagues (54.5% vs 50.9%)

• Organizing ICT resources within the classroom to support collaborative learning (43.1% vs 27.6%).
90% teachers feel that ICT can change the school education system

72% found this policy has changed their practice in the classroom
Teachers’ contribution to implement or modify the ICT policy to the school system
Teachers’ contribution to implement or modify the ICT policy

• 79.2% teachers understand the ICT policy but only 57.8% have policy awareness, and only 42.2% have policy innovation aspect.

• **Implication**: They only have “Executor mindset” – carry out instructions, care no more.

• **Another interpretation**: They might not have been introduced to the overall policy properly or were merely instructed to implement the practice. Might not have seen whole picture.
Teachers’ contribution to implement or modify the ICT policy

• **Urban school teachers** tend to think can contribute more in implementing or modifying an ICT policy (45.5% vs 24.1%).

• They are more diligent in using ICTs in
  - curriculum and assessment (64.5% vs 58.6%)
  - their teaching pedagogy (57.2% vs 52.6%) and
  - organization of their teaching delivery (53.2%: 43.1%)

• Conversely, **rural school teachers** more prone to use pervasive technology to support their students’ learning (34.5% vs 28.7%). Attributed to: Stronger neighbourhood spirit
Pervasive skills of teachers

Teachers are currently low in designing online learning environment, as well as using online facilities to support students’ creativity and collaboration with other schools in learning projects.
Key Role in Introducing ICT: 80.0%
A Leader in Introducing ICT: 85.4%
Colleagues Consult with You to Introduce ICT: 55.4%
Teach in Teachers' in-service courses: 76.2%
Participate in Virtual Professional Communities: 77.7%

Teachers as model learner
Teachers as model learner

• Currently, teachers’ role in introducing ICT is considered more passive, lack initiative.

• The results are consistent with the low innovative contribution of teachers in implementation of ICT policy.

• Possible reason that contributes to this outcome: Ineffective dissemination of the policy generates low awareness, teachers maybe not fully understand the policy intention.
• Pearson correlation - correlations between teachers’ school location, age and gender.

• **Urban school** teachers more receptive towards ICTs – use ICTs to record grades, student records or attendance (p<0.01), presentations (p<0.05) and small group activities (p<0.05), sharing materials with other teachers (p<0.05), collaborate with outside experts (p<0.05) and improve their collaboration (p<0.05) with ICTs.

• 56.9% respondents are at least 40 years old but involvement in Knowledge Creation using ICTs are very discouraging.
Elder teachers

• Elder teachers prefer using conventional method \( (p<0.01) \).

• Seldom use software in teaching, such as word processor, presentation software or any sort of courseware \( (p<0.05) \).

• They try avoid integrating use of a computer lab in teaching activities \( (p<0.05) \) or for individual or small group activities.
Male Teachers

• Male teachers have higher rate of using computer in a week compared to female teachers (p<0.01) and using ICTs to extend their learning opportunities (p<0.05).

• Higher use of ICTs with their students in the context of their discipline (p<0.01) - using digital resources and presentation software

• ICT tools used by male teachers: presentation software (p<0.01), web browser (p<0.01), search engine (p<0.05), email (p<0.05) and online courseware (p<0.01) or open educational resources (p<0.05).
Male Teachers

• They believe they could contribute to modify ICT policy in their schools (p<0.01).
• Hence, male teachers generally demonstrated higher commitment towards to use of ICTs in their learning and teaching activities.
Conclusion

- Teachers’ role in education has changed with the ICT policy to incorporate ICT into teaching.
- Classroom practice changes from teacher-centered to student-centered.
- Teachers required to be manager & facilitator for learning, instead of purely knowledge delivering.
- Need to design, adapt, manage and evaluate the learning process.
- Teachers’ professional development is crucial - learn different learning approaches from traditional teaching methods.
- Policy makers, from Ministry of Education at national level to principals at school level, need to effectively disseminating the policy at teachers’ level and involve them to design the execution process.
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Questions & Feedbacks are welcomed.

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