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Revisioning Information and Communication Technology for Development (ICT4D) at the Comparative & International Education Society (CIES): A Five-Year Account (2009 - 2013)

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ABSTRACT

The purpose of this paper is to provide an account of how Information and Communication Technology (ICT) has evolved as a key topic and research area at the Comparative and International Education Society (CIES) conference. The past five years' CIES conference papers with an ICT component are reviewed for common development trends, opportunities, and challenges. The findings include: 1) ICT has a strong presence at CIES; 2) Countries from Asia, Africa and Northern America regions have been the major contributors to CIES; 3) Educational institutions, private and professional organizations and companies have been the key ICT4D players at CIES; 4) The interaction between ICT and other areas has been established; 5) ICT4D SIG is suggested to further claim its role of connecting, building, and strengthening ICT4D community of practice at CIES. Recommendations are also made for the development of a broad research agenda for the field to grow and mature in this connected global ICT context.

Keywords**:** *ICT; ICT4D SIG; Development Trend; CIES; Educational Technology; Comparative Education; International*

INTRODUCTION

After its inaugural meeting at the Teachers College, Columbia University in New York City in 2008, the Information and Communication Technology for Development (ICT4D) Special Interest Group (SIG) has grown rapidly in number and strength. In 2013, the ICT4D SIG celebrated its fifth anniversary. Thus is it a good time to take a closer look at how the subject matter has evolved, how the context has changed, and what CIES members have been doing in the ICT4D area in this past five years.

Reviewing this evolution not only helps us celebrate what we have accomplished in the past five years as a community of practice (Lave & Wenger, 1991), but also gives us an opportunity to gain better understanding of current ICT4D related issues and to recognize the direction of theory, research, policy, and practice in the ICT4D area in this global context. As the interplay of technology with education is very complex (ITU, 2011; Fu, 2013), effort of such is by all means a central factor in defining our field and defining those of us who work in this field. It is also a necessary step for us to envision what ICT4D community of practice in general and ICT4D SIG at CIES in particular can do in the next five to ten years to contribute to "the future of the EFA movement in a global context" envisioned by 2014 CIES conference committee (CIES, 2014, para. 2).

Therefore, the purpose of this paper is to provide an account of how ICT4D has evolved as a key topic and research area at CIES annual conferences in the past five years. The assumption underpinning this research is that each year's CIES conference papers included in all general sessions with the ICT4D component not only reflect the rapid changing emphasis and orientation of the ICT4D research area, but also provide strong evidence on the growing diversity and maturity of the field itself. This research involved a comparative analysis on 2009-2013 CIES

conference papers that had an ICT4D component. In doing so, this study looked for common developmental trends, opportunities, and challenges by asking the following questions:

1. How is the presence of the ICT4D community of practice at CIES?
2. Which countries and regions' ICT4D initiatives are represented at CIES? And which countries and regions' ICT4D initiatives are not represented?
3. Who are the key ICT4D players at CIES?
4. How does ICT4D interplay with other research areas at CIES?

METHODOLOGY

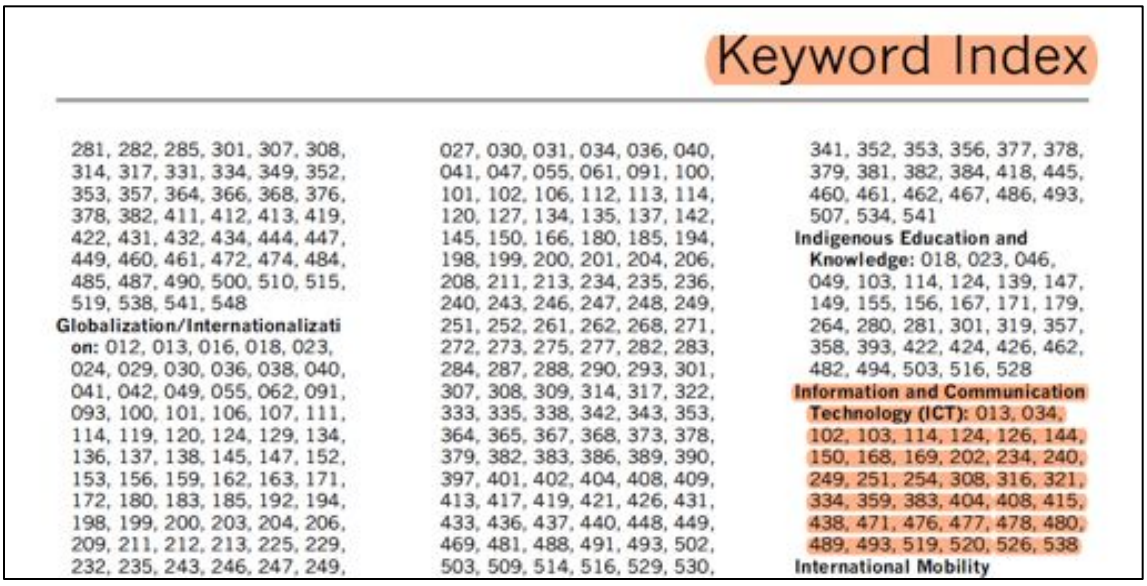
This study is a content analysis of CIES conference papers with an ICT4D component from 2009 through 2013. All conference papers with ICT4D components were retrieved from http://www.allacademic.com/ where recent years' CIES conference papers were archived and indexed. The only exception is the 2011 CIES conference at Montreal, Canada, but the conference's main website (http://cies2011.mcgill.ca/) provides access to the full conference program in pdf format.

The indexes built into CIES's online database and print programs were used to develop the following five categories: SIG, Submission Session, Research Area, Country, and Presenter's Affiliation. The purpose of adopting these existing categories built into the conference management system was two fold. First, I wanted to locate all conference papers with ICT4D components. Second, I wanted to keep the search keys mutually exclusive and inclusive to minimize the chance of missing the "global" development themes/structures (Hand, 2007, p. 621) while still having the ability to organize our conference paper data into different categories for analysis.

Data Collection Procedure

The first step was to locate CIES conference papers with ICT4D components in the past five years from 2009 through 2013. To do so, the phrase "Technology in the classroom and ICTs" was used to conduct key search on "Research Area" with CIES annual conferences held in 2009 and 2010. The rationale behind this search strategy is that this phrase was predetermined by CIES and all conference papers tagged with this phrase self-identified themselves as having an ICT4D component. For conferences held in 2011, 2012 and 2013, CIES changed the phrase to "Information and Communication Technology." The researchers believe that this change was a timely response to the field's rapid development and its broader impact. As researchers and practitioners, we should not constrain our focus merely on ICT4D's impact in classroom settings because education interacts with the socio-cultural context that it is situated in and learning is "communal and in community, rather than an isolated activity" (Merriam, Caffarella, & Baumgartner, 2007, p. 240). Balanced focus is needed on the interaction between ICT4D and education's local and global contexts.

Since CIES conference papers in 2011 were not available from CIES conference e-portal at the time of this study, the search for ICT4D conference papers for that year was done manually using the Keyword Index enclosed at the end of the conference program (See Figure 1).



Keyword Index

281, 282, 285, 301, 307, 308, 314, 317, 331, 334, 349, 352, 353, 357, 364, 366, 368, 376, 378, 382, 411, 412, 413, 419, 422, 431, 432, 434, 444, 447, 449, 460, 461, 472, 474, 484, 485, 487, 490, 500, 510, 515, 519, 538, 541, 548

Globalization/Internationalizati on: 012, 013, 016, 018, 023, 024, 029, 030, 036, 038, 040, 041, 042, 049, 055, 062, 091, 093, 100, 101, 106, 107, 111, 114, 119, 120, 124, 129, 134, 136, 137, 138, 145, 147, 152, 153, 156, 159, 162, 163, 171, 172, 180, 183, 185, 192, 194, 198, 199, 200, 203, 204, 206, 209, 211, 212, 213, 225, 229, 232, 235, 243, 246, 247, 249,

027, 030, 031, 034, 036, 040, 041, 047, 055, 061, 091, 100, 101, 102, 106, 112, 113, 114, 120, 127, 134, 135, 137, 142, 145, 150, 166, 180, 185, 194, 198, 199, 200, 201, 204, 206, 208, 211, 213, 234, 235, 236, 240, 243, 246, 247, 248, 249, 251, 252, 261, 262, 268, 271, 272, 273, 275, 277, 282, 283, 284, 287, 288, 290, 293, 301, 307, 308, 309, 314, 317, 322, 333, 335, 338, 342, 343, 353, 364, 365, 367, 368, 373, 378, 379, 382, 383, 386, 389, 390, 397, 401, 402, 404, 408, 409, 413, 417, 419, 421, 426, 431, 433, 436, 437, 440, 448, 449, 469, 481, 488, 491, 493, 502, 503, 509, 514, 516, 529, 530,

341, 352, 353, 356, 377, 378, 379, 381, 382, 384, 418, 445, 460, 461, 462, 467, 486, 493, 507, 534, 541

Indigenous Education and Knowledge: 018, 023, 046, 049, 103, 114, 124, 139, 147, 149, 155, 156, 167, 171, 179, 264, 280, 281, 301, 319, 357, 358, 393, 422, 424, 426, 462, 482, 494, 503, 516, 528

Information and Communication Technology (ICT): 013, 034, 102, 103, 114, 124, 126, 144, 150, 168, 169, 202, 234, 240, 249, 251, 254, 308, 316, 321, 334, 359, 383, 404, 408, 415, 438, 471, 476, 477, 478, 480, 489, 493, 519, 520, 526, 538

International Mobility

Figure 1: *CIES 2011 Montreal Conference Program Keyword Index*

The second step was to remove the conference papers that were tagged as having an ICT component by error. All the titles located through the "Research Area" search ("Keyword Index" search was used with 2011 CIES conference program) were reviewed. When a title did not show a clear tie to ICT4D, the abstract was reviewed. When an ICT component was not identified through the review, the conference paper was removed from the dataset. For example, a panel discussion session entitled "Deliberating in a Democracy: A Collaborative International Professional Development Initiative" in the 2010 CIES conference program was included in our search results when we did the search using the key phrase "Technology in the classroom and ICTs". We reviewed this panel's abstract (See Figure 2) and did not see a clear connection to ICT4D so it was removed from the data pool.

The panel objectives are to:

- Share promising results and lessons from DID for substantive learning and procedural civic skill building.
- Demonstrate how teachers and non-governmental organizations in different democracies can cooperate to promote democratic principles and effective methodology
- Discuss how DID enables teachers to learn and appreciate among themselves the power of deliberation in their classrooms
- Share how DID provides students with opportunities to discuss substantive content on controversial issues in their democracies and learn from other democratic societies

Figure 2: *Panel Objectives of CANDE SIG Highlighted Session*

After narrowing down the dataset to conference papers having a clear ICT4D component, the search results formed the official data pool and were then sorted by SIG, Submission Session, Country, and Presenter's Affiliation for further data mapping and cluster analysis to find out development themes and structures. Each category was examined for commonalities and connections; mapping and cluster analysis were conducted as well because most conference papers were found cross-listed in more than one category. For content stratification purposes, the conference papers with an ICT4D component were put into a main category based on the perceived focus of each analysis.

To make this review more inclusive to represent ICT's presence at the various venues of CIES annual conferences, all sessions were included in our search and analysis. See Figure 3 for included session types.

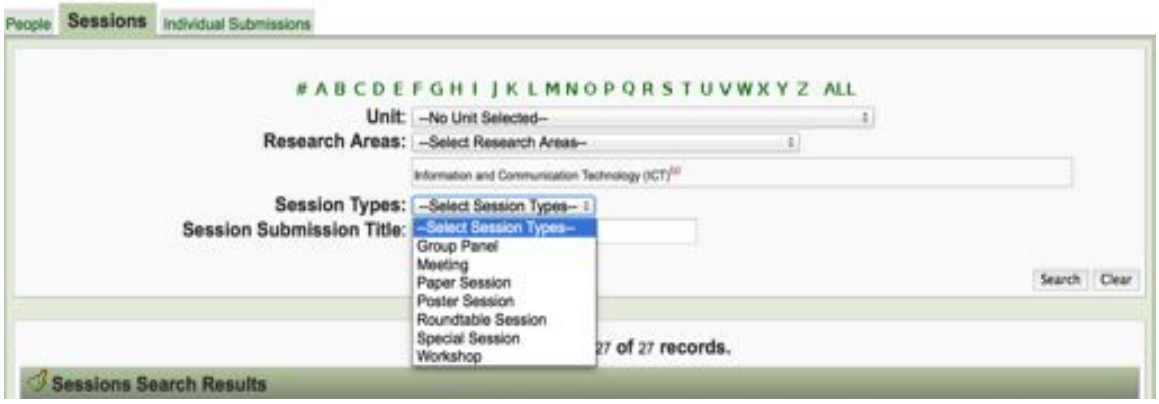


Figure 3: *CIES Conference Program Session Types*

FINDINGS AND DISCUSSION

ICT4D Has a Strong Presence at CIES

After a search in "Research Area" and a systematic title review of 2009 through 2013 CIES conference papers, our search yielded 230 titles that had an ICT4D component and all these conference papers were spread out into 112 sessions. Table 1 shows a breakout of the number of conference papers on ICT and the number of sessions that included more than one presentation on ICT4D at each year's CIES conference. On average, 46 conference presentations were made on ICT4D in 22 sessions at each year's conference.

Table 1: *Summary of 2009~2013 CIES Annual Conference Papers on ICT4D*

Year	Search Key Phrases	Number of Sessions / Presentations
2013	"Information and Communication Technology"	27/52
2012	"Information and Communication Technology"	18/39
2011	"Information and Communication Technology"	33/53
2010	"Technology in the classroom and ICTs"	15/40
2009	"Technology in the classroom and ICTs"	19 /46
Total		112/230

If ICT4D conference papers were all arranged to present on the same day, the conference's entire half-day agenda would be easily filled. Therefore, ICT4D has maintained strong presence at each year's CIES annual conference and shows a strong legacy in the history of CIES.

Countries and Regions Represented at CIES

The United Nations (2012) maintains a full list of countries in the world and these countries are organized into six broad regions including Africa, Asia, Europe, Latin America and the Caribbean, Northern America, and Oceania. The aforementioned 230 conference papers on ICT4D were sorted by countries and regions and mapped against the United Nation's member state list to find the country and region representations at each year's CIES conference.

As shown in Figure 4, all six regions were represented at CIES annual conferences in the past five years with Asia, Africa, and Northern America being the major contributors to each year's conference. These five years also witnessed the region of Africa's rapid growth from about six conference papers on ICT4D at 2009 conference to about 24 conference papers at 2013 conference. A possible explanation could be the worldwide efforts and projects initiated and led by organizations such as UNESCO to help African countries to develop information and communication technology.

The region that has not been well represented is the region of Oceania with only five conference papers on ICT4D in total in the past five years. Knowing the fact that countries such as Australia and New Zealand who have done a lot of wonderful research and practical projects on ICT4D are both located in the Oceania region, it is a little bit disappointing not seeing many conference papers on ICT4D from this region presented at CIES annual conferences. Would their contribution be critical to ICT4D development at CIES? Do they publish and present using different venues? If so, what are they? Do we care to know? These are the questions that may need to be addressed when thinking about growing our community of practice at CIES in the next five to ten years.

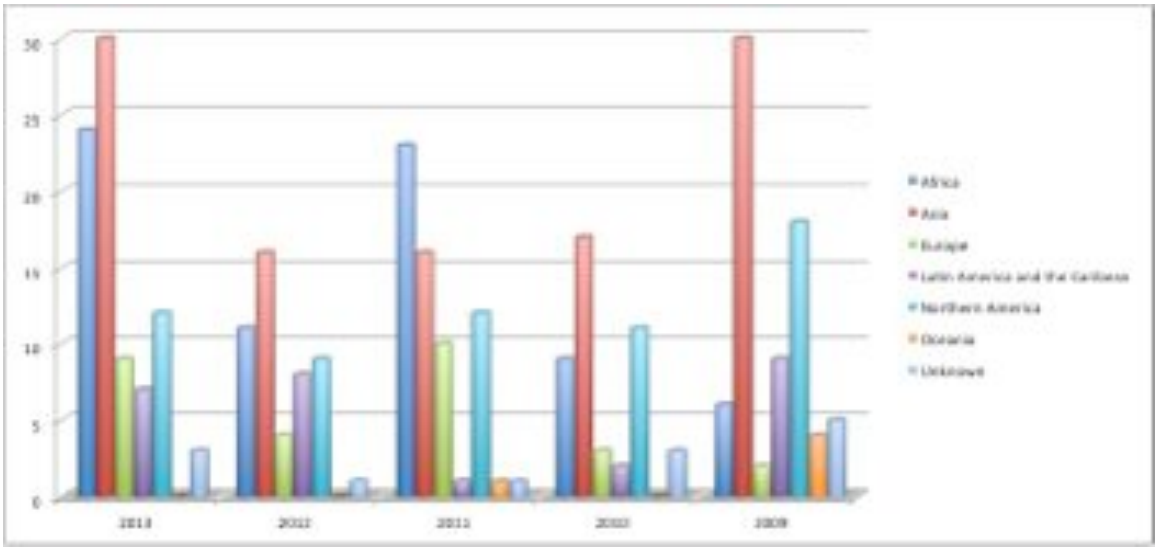


Figure 4: *Regions Represented at CIES's Annual Conference from 2009 through 2013*

To understand country representations by ICT4D conference papers, cluster analysis was conducted at the country level (See Table 2). After combining the five-year country data and removing duplicated countries (each country was counted only once during this five year period regardless of how many presentations were made each year), I located 89 countries that were represented in the aforementioned 230 ICT4D presentations.

***Table 2**: Countries Most Represented at CIES's Annual Conferences from 2009 through 2013*

Year	Number of Countries	Instances of Presentations		
		No. 1 Represented	No. 2 Represented	No. 3 Represented
2013	>46	US (11)	India (6), South Africa (6)	N/A
2012	>32	US (8)	Mexico (5)	United Republic of Tanzania (3), Mongolia (3)
2011	>37	US (11)	South Africa (4), Spain (4)	N/A
2010	> 27	US (10)	Turkey (3), Yemen (3)	N/A
2009	>32	US (15)	China (6)	India (5), Korea (5)

The 2013 CIES annual conference had the greatest diversity representing more than 46 countries followed by the 2011 CIES conference that represented more than 37 countries. The reason a ">" sign was put before the number of countries in the second column is that each year had several presentations for which the presenter(s) did not specify their studies' country contexts and the authors were unable to tell their studies' country contexts by reading their conference papers. I did not want to under-calculate the number of countries represented at each year's conference nor overestimate. Therefore, the ">" sign was added to indicate that most likely there were a few more countries represented than what were identified in this study.

The numbers in brackets next to each country in columns 2 - 6 of Table 2 shows the number of ICT4D presentations presented at that year's conference. As shown in Table 2, ICT4D presentations from the United States (Northern America region) dominated each year's conference followed by China (Asia region) in 2009, by Turkey (Asia region) and Yemen (Asia region) in 2010, by South Africa (Africa region) and Spain (Europe region) in 2011, by Mexico (Latin America and the Caribbean region) in 2012, and by India (Asia region) and South Africa (Africa region) in 2013. This result is in line with the above finding that the past five years' CIES conferences highlighted countries from Asia, Africa, and Northern America regions. Where the conference is held (See Table 3) could be a possible reason to explain why the United States had the highest number of each year's ICT4D presentations, but it is not clear why we see more ICT4D presentations from Asia and Africa regions than from other regions.

***Table 3**: CIES Conference Locations from 2009 through 2013*

Year	Location
2013	New Orleans, Louisiana, US
2012	San Juan, Puerto Rico
2011	Montreal, Quebec, Canada
2010	Chicago, Illinois, US
2009	Charleston, South Carolina, US

ICT4D Players Presented at CIES

It seems that we are all living a technology-mediated life and working in a technology-facilitated environment, but who are the key ICT4D players represented at CIES? "Though individuals are the units of adaptation, they are not the units of actual evolution. The units of evolution are necessarily social groups, structures, and systems at all levels of size and complexity" (Sanderson, as cited in Kang, 2009, p. 160). A cluster analysis was done using the presenter's affiliation to understand what types of organizations and institutions were the key ICT4D players at CIES in the past five years. According to the nature of each entity, the data was organized into four categories including: (1) Governmental agencies (i.e. Department of Education of the Philippines, Ministry of Education Sports and Culture of Samoa, etc.), (2) private or professional organizations, and companies (i.e., NGOs, consulting companies, etc.), (3) educational institutions, and (4) others (i.e., independent consultant, etc.).

After combining the five-year presenter affiliation data and removing duplicated data entry (each entity was counted only once during this five year period regardless of how many presenters from this entity presented at each year's CIES conference), 141 organizations and institutions were identified. The commonalities shared by these entities include: they came to CIES from different parts of the world, most of them have been active players in the field of ICT4D for years, and all were represented by the aforementioned 230 ICT4D presentations. Sixty-five percent of them were educational institutions (i.e., Stanford University, USA; Belgorod State University, Russian Federation; etc.) and 28% were private or professional organizations and companies (i.e., RTI International, Intel Corporation, etc.). Therefore, they were the key ICT4D players at CIES in the past five years and need to be commended for being the main driving force for making ICT4D a core topic and research area at each year's CIES conference.

With duplicated data entries removed (one conference paper was treated as one data entry regardless of how many presenters were listed), Table 4 lists the number of entities that presented ICT4D research and projects at CIES annual conferences in the past five years. The first three entities that sent the largest delegation of presenters to present on ICT4D at each year's CIES conference are also listed in Table 4. This finding reaffirms that educational institutions and private or professional organizations and companies were the two major forces driving ICT4D at CIES in the past five years.

As we know, in many countries, governments play the key role in their ICT development. It would be great if governments of developing and third world countries were encouraged to present their ICT4D research and practical projects at future CIES annual conferences. Hearing voices from all parties and learning from each country's experience would make it easier for the field to form synergy to study global factors affecting ICT4D integration into our daily life, to identify best research and practices that can be borrowed and adapted from one socio-cultural context to another, and to develop partnership to share ICT4D resources and social capital to maximize the benefits for each country.

***Table 4**: Key ICT4D Players Represented at CIES Annual Conferences from 2009 through 2013*

Year	Number of Entities Represented	Number 1 Represented	Number 2 Represented	Number 3 Represented
2013	47	Education Development Center, Inc. (7)	Penn State University (USA) (6)	Hazara University (Pakistan) (5)
2012	46	Universidad Autónoma de Tamaulipas (Mexico) (6)	University of Kentucky (4), Tokyo Institute of Technology (4) Penn State University (4), Anadolu University (Turkey) (4)	N/A
2011	46	Universitat Oberta de Catalunya, Spain (10)	RTI International (5), Concordia University, Canada (5),	N/A
2010	38	Michigan State University (6)	University of Minnesota (4), SRI International (4), Penn State University (4),	N/A
2009	38	University of Toronto(6)	Teachers College, Columbia University (4)	SRI International (3), American Institutes for Research (3), Academy for Educational Development (3)

ICT4D Infusion at CIES

After the ICT4D SIG's inaugural meeting five years ago, each year's CIES conference assigned one to two sessions to highlight ICT4D conference papers, which, as indicated in the above analysis, would never be enough to accommodate the need. Many conference papers having an ICT4D component were put into other sessions based on other key research areas self-tagged by the presenters. Hence, word cloud analysis was conducted on "Research Area" self-identified by ICT4D presenters to shed light on the interplay between ICT4D and other research areas presented at each year's CIES conference. The more frequently a phrase is used to describe a proposal's research area, the larger it appears in Figure 5. This analysis technique is referred to as word or tag cloud analysis. It is useful for visualizing the most prominent terms to determine its relative prominence (Souto, 2009).

Figure 5: *Connections Between Research Areas at CIES's Annual Conferences from 2009 through 2013*

The above analysis indicates that ICT4D is deeply infused into each year's CIES conference and shows clear interaction between ICT4D and the various social issues pursued by CIES members. Some example social issues that ICT4D have been used to address include: access, adults, assessment, best practices, development, education, equity, gender, globalization, literacy, policy, teacher, among others. Some popular topics that many ICT4D conference papers presented on in the past five years include the search for best practices on ICT4D integration, ICT4D use in teacher education and training, assessment of ICT4D's effectiveness (quality), ICT4D vs. education access and equity (gender), ICT4D policies, ICT4D in developing countries (globalization and internationalization), ICT4D and social reforms, among others. Examples of research areas that overlaps with ICT4D in the past five years include: Adult Education, Equity and Access, Literacy, Assessment, Teacher Education and Professional Development, Primary/Secondary Education, and Gender Issues, among others.

A further analysis of the ICT4D conference papers tagged with research areas other than ICT4D indicates strong interplay between ICT4D and other SIGs and standing committees. Figure 6, for example, shows that ICT4D conference papers were highlighted in eight SIGs and two standing committees in the past five years. If we trace ICT4D development trend in this global context, it is logical to envision that the tie between ICT4D SIG and all the other SIGs and standing committees will be stronger and the interplay between them will be more energetic. The next five to ten years will witness more and more cross-SIG collaboration and cooperation.

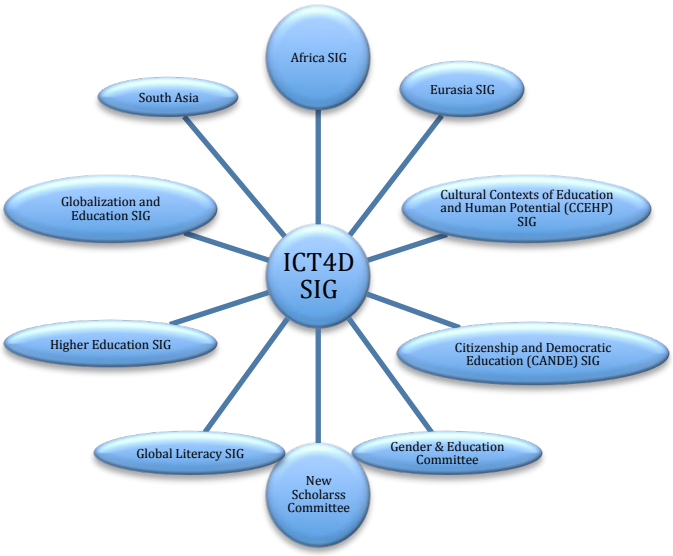


Figure 6: *Interplay Between CT4D SIG and Other CIES SIGs/Standing Committees*

CONCLUSIONS AND RECOMMMENDATIONS

The ICT4D SIG has grown rapidly in number and strength in the past five years at CIES. The data analysis demonstrated strong ICT4D presence at CIES. In particular, the study showed: (1) on average, conference papers with an ICT4D component were presented at each year's conference; (2) five of the six regions defined by UN and more than 27 countries were consistently represented at each year's conference; (3) educational institutions and private or professional organizations and companies comprised the major active ICT4D players at CIES; and, (4) strong connections between ICT4D and those topics and research areas pursued by other CIES SIGs and groups were established. It is clear that CIES members have recognized the indispensible role ICT4D plays in "the future of the EFA movement in a global context" envisioned by 2014 CIES conference committee (CIES, 2014, para. 2).

The results of this study are in line with previous studies on the trends and issues of ICT4D that digital divide remains an enduring concern in many countries (ITU, 2011; Manalo & Fliert, 2011; Marais, 2011). Capturing the fifth wave of development informatics research (Heeks, 2014), the findings of this study also highlight the contribution of applied research to the field of ICT4D (Chepken *et al*., 2012) and emphasize the importance of not underestimating the role non-technology factors play in the integration of ICT4D into education (Fu, 2013; Hamel, 2010; ITU, 2011; Wagner, et al, 2005).

Further, this study identified several research gaps that need to be filled. For example, in the past five years, not many presentations addressed how individuals involved in ICT4D, such as administrators, teachers, and learners, develop the skills and dispositions associated with learning equity and learning access; not many cross-country/culture ICT4D presentations were conducted; and, there was a paucity of presentations on the philosophical underpinning of the field. Even though, the conference index term was changed from "Technology in the classroom and ICTs" to "Information and Communication Technology (ICT)", no significant shift in the foci of the ICT4D field was identified. Therefore, future research studies are suggested to address the following areas:

1. Identify the characteristics of the global population that benefits from the use of ICT and the global population that suffers because of ICT integration in different countries and regions;
2. Explore the various research sub-areas under the big ICT4D umbrella;
3. Study ICT4D use in sub-regions listed on UN's member state list;
4. Make special efforts to bring more countries from underrepresented regions (i.e., Oceania) to CIES annual conferences to share their ICT4D achievements and lessons;
5. Test the various international comparative research methods in the context of ICT4D;
6. Develop and validate research topic appropriate instruments;
7. Develop indicators for sustainability in ICT4D that have strong research and practice base and application;
8. Conduct more cross-country/culture comparative ICT4D studies;

Effective exploration of these areas under the big ICT4D umbrella requires the active participation of scholars and practitioners who recognize the complex and overlapping contextual differences and who take opportunities to make sense of, and do something about, equity of learning outcomes and bridging ever-widening inequality of access to higher levels of learning worldwide. It is time for ICT4D SIG at CIES to claim its coordinator role to connect and build ICT4D Community of Practice. The ICT4D SIG must:

- Strengthen connections with the key ICT4D players at CIES and pursuing collaborations and partnerships with other SIGs and standing committees;
- Provide resources to encourage countries from less represented regions to participate in future ICT4D events at CIES;
- Network with ICT4D groups in different countries and regions to form synergy to address ICT4D issues and challenges from a more holistic approach;
- Form small research groups to help define the field, identify research sub-areas, create research-based indicators for quality ICT4D projects, develop and validate research methods and instruments for conducting cross-cultural ICT4D research studies.

In conclusion, ICT4D holds significant promise to address learning equity and access but more synergistic approaches, such as human scale development (Marais, 2011) and sustainable human development (Hamel, 2010), are needed to maximize ICT4D's potential benefits for human development. Even though this study only scratched the surface of the direction and evolution of ICT4D from reviewing the related conference papers presented at CIES from 2009 through 2013, the seed is planted for the development of an international comparative research agenda that could grow in many directions in the broad context of ICT4D.

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