On the applicability of COSMIC-FFP for measuring software throughout its life cycle

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Presented at

ESCOM-SCOPE 2000, Munich, Germany

April 18-20, 2000
Agenda

- **Context**
- **Early size estimation**
- **Designing Early & Quick COSMIC C-FFP**
- **Further research**
- **Conclusion**
Software size is a key variable in software engineering economic models

Technical size (SLOC) is available too late in the development process

Functional size (COSMIC C-FFP), although available earlier, is not yet “early enough”

Goal: Explore how COSMIC C-FFP could be used “early on” in the development process?
Early size estimation

Software development “size paradox”

“Early” sizing is therefore the result of a compromise between usefulness and precision

From the perspective of managing the development of new software
Early size estimation

**Early**
Size value is obtained before a significant amount of resources have been committed.

**Quick**
Size value is obtained under constraints, such as time or cost, preventing precise measurement.

**Size Measurement**
Size value is obtained by rigorous application of the rules and procedures of the COSMIC-FFP measurement manual.

**Size Estimate**
Size value is obtained by techniques producing a forecast of the measured size.
Early size estimation

- Early Function Point (EFPA) is a technique to forecast the functional size of software

- The usefulness of EFPA has already been demonstrated\(^1\)

- How could it be applied to COSMIC-FFP?

Note 1: See references 5, 6, 8, 10 and 11 in the proceedings paper
Designing Early & Quick COSMIC C-FFP

- Structure of IFPUG FPA
- Structure of EFPA
- Structure of COSMIC C-FFP
- Preliminary model of E&Q COSMIC C-FFP
- Similarities and differences
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Structure of IFPUG FPA

IFPUG Software model (flat)

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Structure of EFPA

EFPA Software model (hierarchical)
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Structure of COSMI C-FFP

COSMI C-FFP Software model (hierarchical)
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A preliminary model

- “Proto-function” structure
- Quantifying “proto-function”
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A preliminary model - “Proto-function” structure

- Standardize taxonomy around “process”
- Functional processes not classified as I,O,Q
- Three size qualification (small, medium, large)
- Equal contribution of FP size hypothesized
- No contribution from data groups
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A preliminary model - “Proto-function” structure

- Functional users requirements
  - Macro-process type
    - General process type
      - Typical process type
      - Functional process type
        - Sub-process
          - Data movement type
          - Data manipulation type
### Designing Early & Quick COSMIC FFP

#### A preliminary model - Quantifying “Proto-function”

<table>
<thead>
<tr>
<th>Macro process</th>
<th>General process</th>
<th>Functional process</th>
<th>No. Gen. process</th>
<th>No. Func. process</th>
<th>No. of BFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>small</td>
<td>small</td>
<td>small</td>
<td>2 to 3</td>
<td>6 to 12</td>
<td>20 to 25</td>
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<tr>
<td>medium</td>
<td>medium</td>
<td>medium</td>
<td>4 to 7</td>
<td>13 to 19</td>
<td>6 to 12</td>
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<tr>
<td>large</td>
<td>large</td>
<td>large</td>
<td>8 to 12</td>
<td>20 to 25</td>
<td>to be determined empirically</td>
</tr>
</tbody>
</table>

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Both approaches propose a hierarchical view

Size units can be assigned at any level within these hierarchies

Both approaches use analogies to identify functional components
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A preliminary model - EFPA/ E&Q CFFP differences

- Base functional components (BFC) lies at a different functional level
- Size units are defined differently
- Data groups contribution differs
Further research

- Validate basic hypotheses and principles
- Determine empirical values for functional processes
- Quantify relationship between BFC
- Study structure of “processes mix” across software domains
Conclusion

- Preliminary work indicates feasibility of obtaining “quick and early” CFFP,
- Empirical calibration required at the functional process level,
- Further results to be published within the CFFP Measurement Manual
Acknowledgments

- The Software Engineering Management Research Laboratory of the Université du Québec à Montréal is supported through a partnership with Bell Canada.

- Additional funding is provided by the Government of Canada.