

国際的に通用する高度IT技術者の
育成・評価を推進する戦略とは？

J07, JABEE, 技術士, CCSF, CITP, ISO/IEC 24773を巡って

IT資格に関する国際動向と 人材育成制度の整合化

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背景

ITは社会インフラ

ITは、ビジネスや社会におけるイノベーション・ドライバ

- ITはワークフロー、ビジネスモデル、文化を変革する

高度IT人材の育成・評価は極めて重要

- 「最先端IT国家創造宣言」(閣議決定)

系統的な育成・評価システムが必要

- 中学・高校におけるIT教育, 大学における一般情報教育
- 大学や大学院におけるIT専門教育
- 教育における質保証
- ITプロフェッショナルの育成
- 高度IT人材の適正な評価と処遇

IT人材育成やIT資格に関する取り組み

ISO/IEC 24773

IFIP IP3

IT融合人材

i-コンピテンシ・
ディクショナリ

認定情報技術
者制度(CITP)

技術士制度
改革

J07後継カリ
キュラム標準

情報分野の
参照基準

JABEE

ISO/IEC 24773:2008

- ソフトウェア技術者の資格制度に関する国際標準
 - Software engineering - Certification of software engineering professionals
 - 様々な資格制度を比較する枠組み
- Certification に対する主要な要件
 - 知識・スキルの明確化
 - 業務遂行能力の評価
 - 倫理綱領・行動規範の遵守
 - CPD (継続研鑽, Continuing Professional Development)
 - 資格の定期更新

} Qualification に対する要件

CITP は ISO/IEC 24773 の要件を満たすように制度設計

ISO/IEC 24773 の改訂

- ISO/IEC JTC1/SC7/WG20 が 24773 の改訂を担当
 - 適合性評価 (Conformity Assessment) の概念を導入
 - システム工学 (Systems Engineering) 分野を対象に追加
 - 様々な資格制度の関係を明確化
- Part 1 (General Requirements) 原案について CASCO と調整中
- 情報処理学会も co-editor を出して改訂に参画

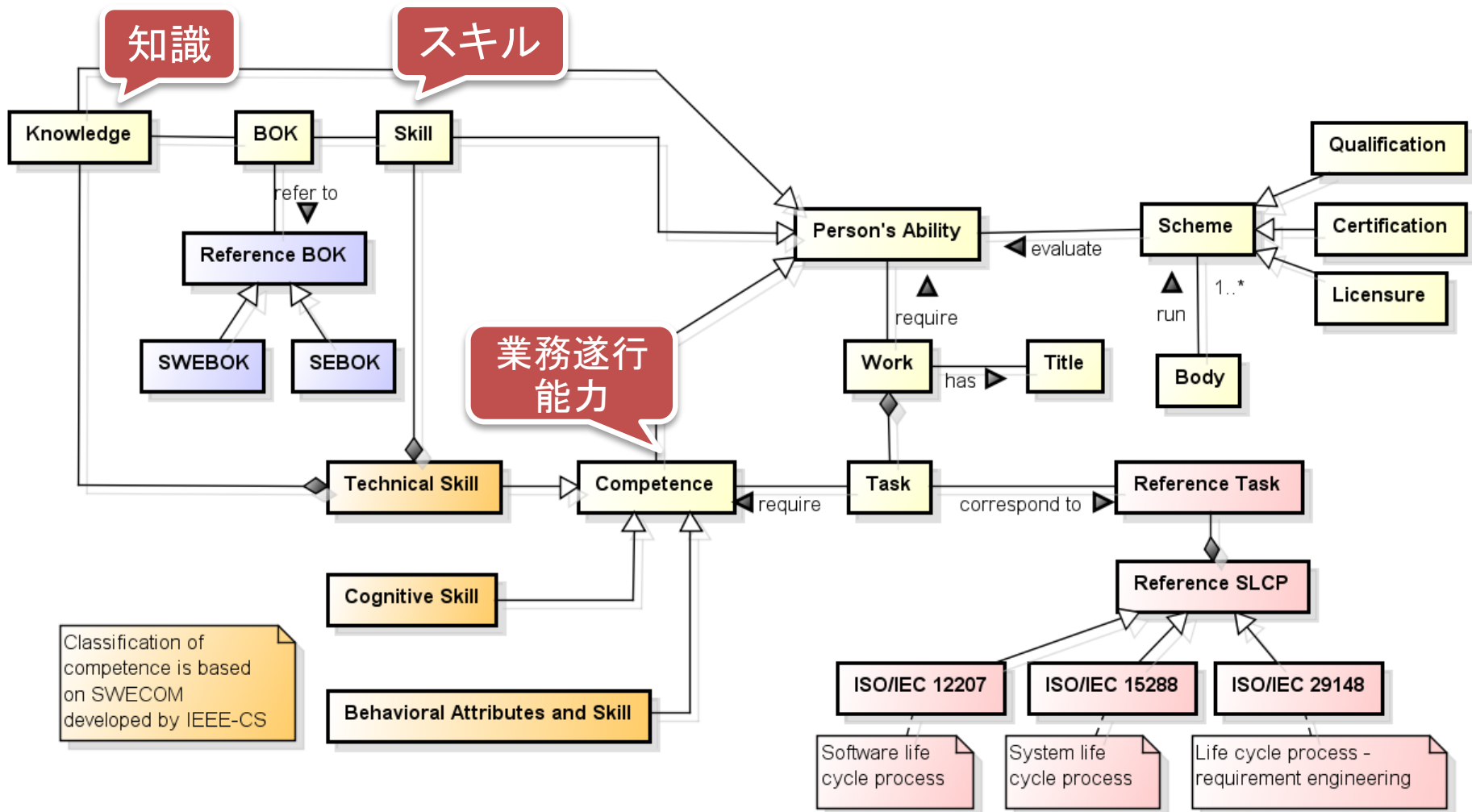
ISO Committee
on Conformity
Assessment

ISO/IEC 24773要件	IEEE-CS, INCOSE	ACS(豪), CIPS(加)	情報処理 技術者試験	技術士 (情報工学)	ITベンダーの 社内資格制度
知識・スキルの明確化	○	○	○	○	○
業務遂行能力の評価	○	○	○	○	○
技術者倫理の遵守	○	○	○	○	○
CPD(継続研鑽)	○	○	○	○	○
資格の定期更新	○	○	○	○	○

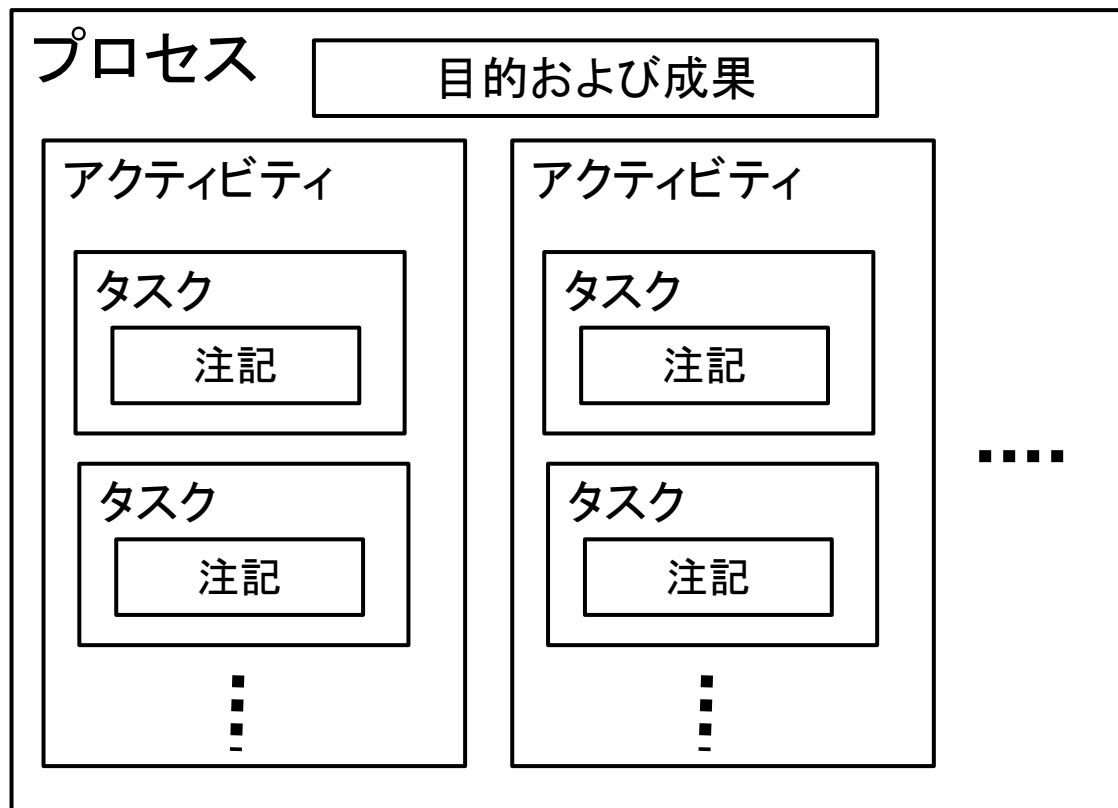
現状

CITPと組み合
わせることで
ISO/IEC 24773
に準拠

ISO/IEC 24773 改訂案の主要な概念



プロセス標準の構造



プロセス

システム開発作業を役割の観点でまとめたもの

- 企画プロセス
- システム開発プロセス, etc.

アクティビティ

関連の強いタスクをまとめたもの

- システム化構想の立案
- ドメインの設計, etc.

タスク

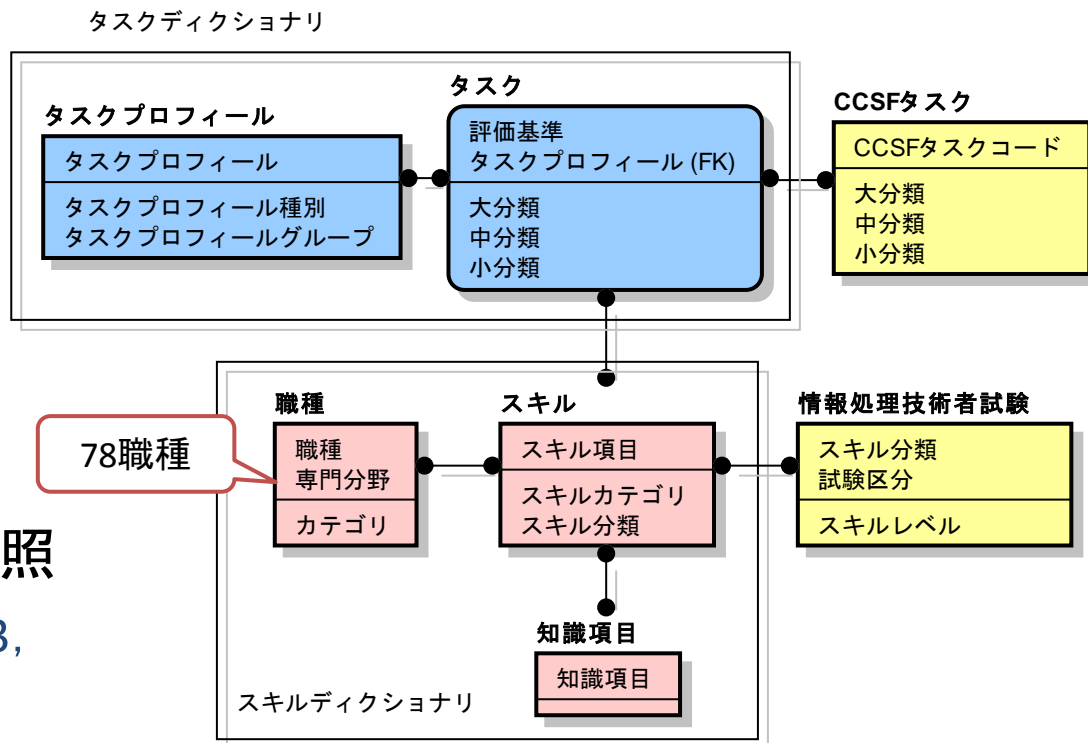
成果を得るための個別の作業

- コードの検証
- DBの詳細設計, etc.

- ISO/IEC 12207:2008, Systems and software engineering – Software life cycle processes
- ISO/IEC 15288:2008, Systems and software engineering – System life cycle processes
- ISO/IEC/IEEE 29148:2011, Systems and software engineering – Life cycle processes – Requirements engineering

i-コンピテンシ・ディクショナリ

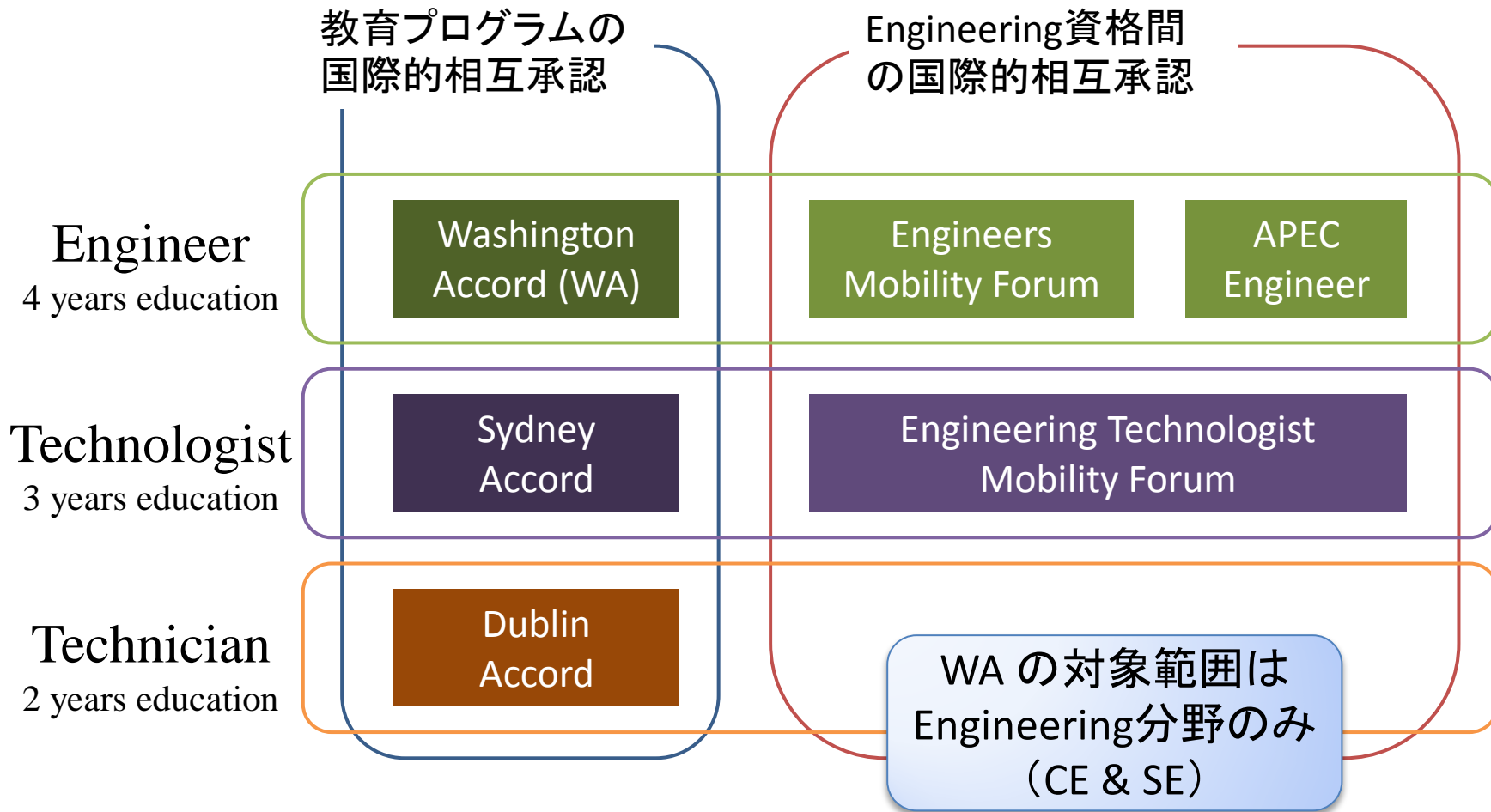
- IT人材のタスク, 職種, スキルを整理・体系化
- 既存の取り組みとの対応付け
 - 情報処理技術者試験
 - スキル標準 (ITSS, ETSS, UISS)
- 主要なプロセス体系を参照
 - 共通フレーム2013, ITIL V3, COBIT 5など
- 主要な知識体系を参照
 - CCSF BOK, J07, BABOK, REBOK, SWEBOKなど



ISO/IEC 24773やISOプロセス標準とも整合

ECとほぼ同様の取り組み (e-Skills & e-CF)

International Engineering Alliance (IEA)



Computing分野における国際協定

教育プログラムの
国際的総合承認

IT Professional
Undergraduate Level

Seoul
Accord (SA)

SA によって CS, IS, IT等
の国際的同等性を確保

IT分野の資格制度間の
国際的相互承認

IFIP IP3

IP3 は EMF/APEC Engineer
に相当する枠組み

IP3の資格制度

- IP3: International Professional Practice Partnership
 - IFIPが設置した, 高度IT人材資格制度の推進組織
 - 国際的な相互資格認証の枠組みを導入
 - 情報処理学会は2009年6月に加入. 2010年1月よりボードメンバー
- IP3による相互資格認証
 - ISO/IEC 24773等を参照
 - 各国の資格制度に一定の要件を課すことにより, 国際同等性を確保
 - IFIPが各国のメンバー学会を資格認証機関として認定
 - CITPはIP3の認定を取得予定 (ISO/IEC 24773準拠を証明)

IP3 への提案

- ISO/IEC 24773に基づく
適合性評価機関の設立

ACM Podcast

stephenibaraki.com/acm/interviews/v0714/tetsuro_kakeshita_acm.html



Association for Computing Machinery
Advancing Computing as a Science & Profession

INTERVIEWS

INTERVIEWS by STEPHEN IBARAKI

Professor Tetsuro Kakeshita, International Leader in Computer Science Education, Accreditation and Certification

This week, Stephen Ibaraki has an exclusive interview with Professor Tetsuro Kakeshita.



Tetsuro Kakeshita received his Ph.D. degree in Computer Science from Kyushu University in 1989. Currently he is an associate professor at Saga University, Japan.

His major research interests include quantitative analysis of ICT education and ICT certification, and complexity analysis of database and software systems. He developed a systematic education program in computer science in his department in 2002. The program was accredited by JABEE (Japan Accreditation Board in Engineering Education), in 2003, which is the second accredited computing program in Japan. He then collaborated with JABEE from 2004 as a chair/member of several accreditation teams, a criterion committee member, and member of an accreditation committee in charge of the computing and IT-related domain. He established the Forum for high level human resource development at IPSJ (Information Processing Society of Japan), in 2007. The discussion at the forum led to the creation of the certified IT professional (CITP) system which IPSJ is just starting. He also developed an accreditation organization for IT professional graduate schools with JABEE and IPSJ in 2010. He received an excellent educator award from IPSJ in 2013. He also joined ISO/IEC JTC1/SC7/WG20 from 2013 and currently is a co-editor of the revision project of ISO/IEC 24773 Software and Systems Engineering: Schemes for the Certification of Software and Systems Engineering Professionals. He is a member of IPSJ, IEEE Computer Society and ACM.

PARTIAL EXTRACTS AND QUOTES FROM THE EXTENSIVE DISCUSSION:

Q: Tetsuro, thank you for sharing your deep experiences with our audience.

A: *"Thank you for providing me an opportunity to share knowledge through this interview. I used to study at the Department of Computer Science, McGill University as a visiting student when I was a Ph.D. candidate. I also had a chance to visit a Canadian university¹ for CEAB (Canadian Engineering Accreditation Board) accreditation as an international observer in 2005. I was an editor of the IPSJ Journal of Digital Practices, for their special issue on certification for high level IT professionals in 2011. The special issue also contained an article on the CIPS certification system. So I have experienced various aspects of education, accreditation and certification both in Japan and Canada, so I hope this interview provides a better understanding of these aspects."*

Q: Recently your outstanding paper entitled "Requirement Analysis of Computing Curriculum Standard J07 and Japan Information Technology Engineers Examination Using ICT Common Body of Knowledge" was specially selected for JIP (Journal of Information Processing) Vol. 22, No.1. https://www.istage.ist.go.jp/article/ipsjip/22/1/22_1/article. Can you outline the domains covered by the paper?

A: *"Thank you for mentioning our recent research contribution. In this paper, we analyzed the relationship among the various domains of computing curriculum and the most major IT examination in Japan."*

Q: What did you hope to accomplish with the paper?

A: *"The Computing Curriculum Standard J07 was developed by IPSJ mainly based on CC2005, Computing Curricula 2005: The Overview Report, and the related curriculum guidelines. The Computing Curricula is separated into five domains, CS, CE, SE, IS and IT. The guidelines of these domains are developed by different communities so that the relationship among the five domains was not clear for society or for college professors majoring in computing. I think that such situation is not desirable since industry does not understand various educational efforts conducted by academia. As a result, the student's learning effort tends to be neglected during job hunting activities and after they are employed.*

The Japan Information Technology Engineer Examination (JITEE) is a large IT examination in Japan with 400,000 examinees each year. Although JITEE is well recognized throughout the industry, not many universities utilize the requirements for their education. This is another mismatch between academia and industry.

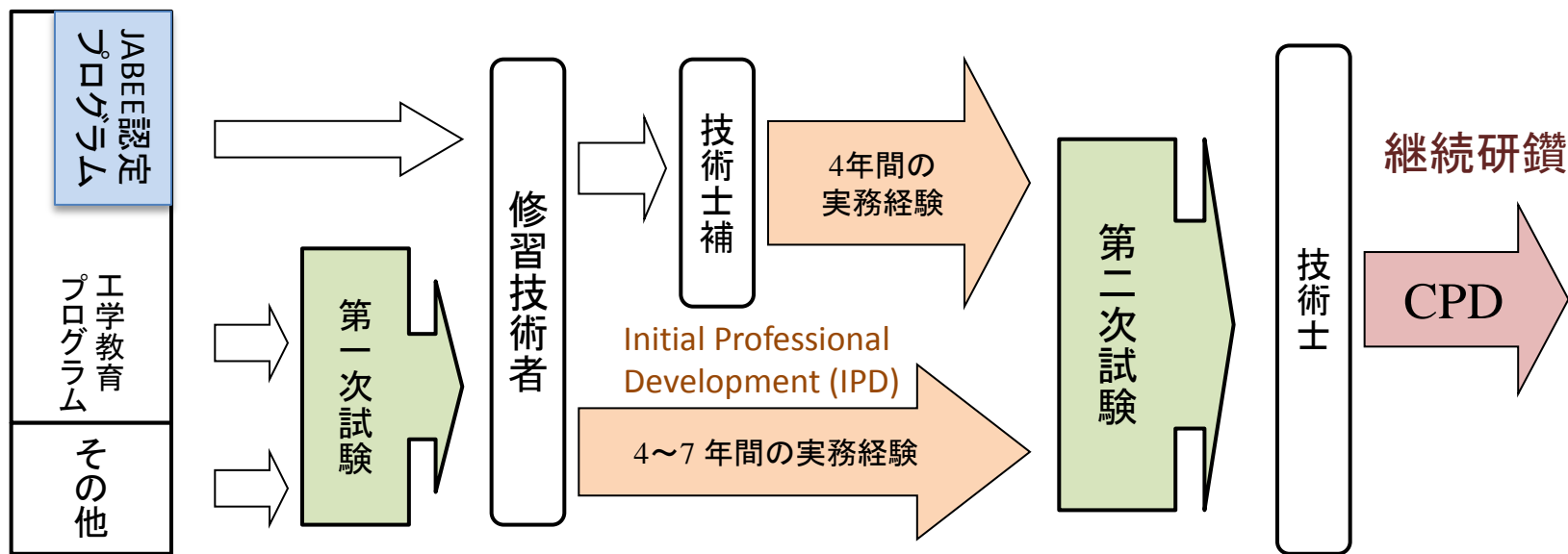
Taking into consideration the above situation, in this paper I tried to clarify the relationship among J07 domains and JITEE. This makes it possible to

http://stephenibaraki.com/acm/interviews/v0714/tetsuro_kakeshita_acm.html

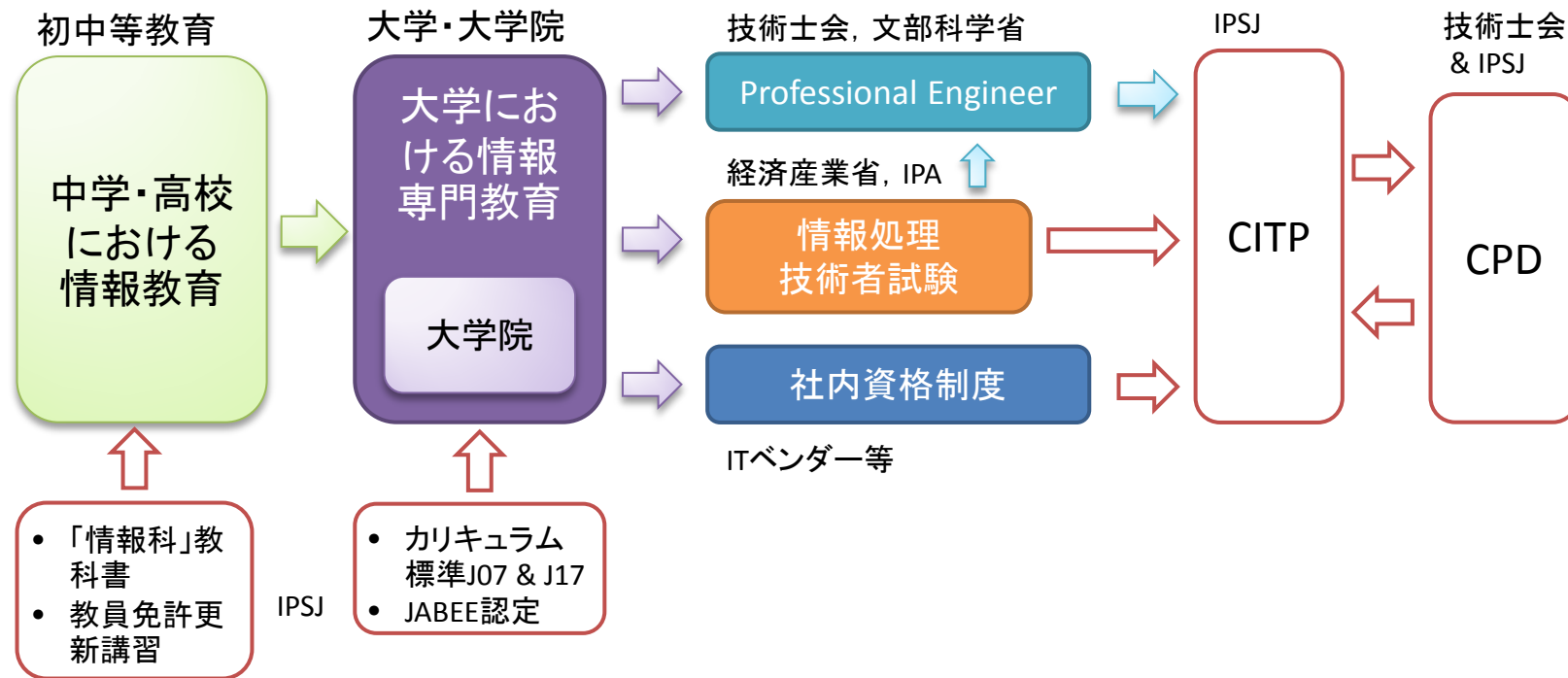
日本技術士会と情報処理学会の連携

高度な情報技術者の育成・可視化および情報系プロフェッショナルコミュニティの形成に関する覚書

- CITPに係る制度検討および審査・運営に関する活動
- 情報分野の技術士およびCITPを対象とするCPDに関する活動
- 情報分野の修習技術者を対象とするIPDに関する活動
- 情報分野における大学教育の質保証の推進に関する活動



情報処理学会のビジョン



整合性の取れた教育・人材育成・評価の仕組みが必要

個別の取り組みを行っている組織間の連携が重要

社会やITユーザーに対する効果的なサービスチェーンの構築

ご清聴
ありがとう
ございました