Legal, Social, Ethical and Professional Issues

CSCU9P5 - Software Engineering I

Professional Issues

Dictionary definitions

profession …

a : a calling requiring **specialised knowledge** and often long and intensive academic preparation

b : a principal calling, a vocation, or **employment**

c : the **whole body** of **persons** engaged in a calling

professional …

a : of, relating to , or characteristic of a profession

b : engaged in one of the **learned societies**

c : characterised by or conforming to **technical or ethical standards** of a profession

professional …

the **conduct, aims, or qualities** that characterise or mark a profession or a professional person ...

a **profession** involves a **set of persons** using **knowledge** to engage in a **set of activities** with some **standards**.

Components of a profession:

- an intensive **course of study**
- **professional practice**
- **professional development** in terms of further study after beginning professional practice
- a **level of skill** in applying acquired knowledge
- adequate **measures** of the education, training, and competence of the individual professionals through some form of **accreditation** and **certification**

Profession

Professions need to ensure that the knowledge and skills are put to **socially responsible** uses.

This is usually in terms of a **code of ethics** and/or a **code of practice** or **conduct.**

There is an implication that a profession has an identity, usually manifested as a **professional society.**

Profession

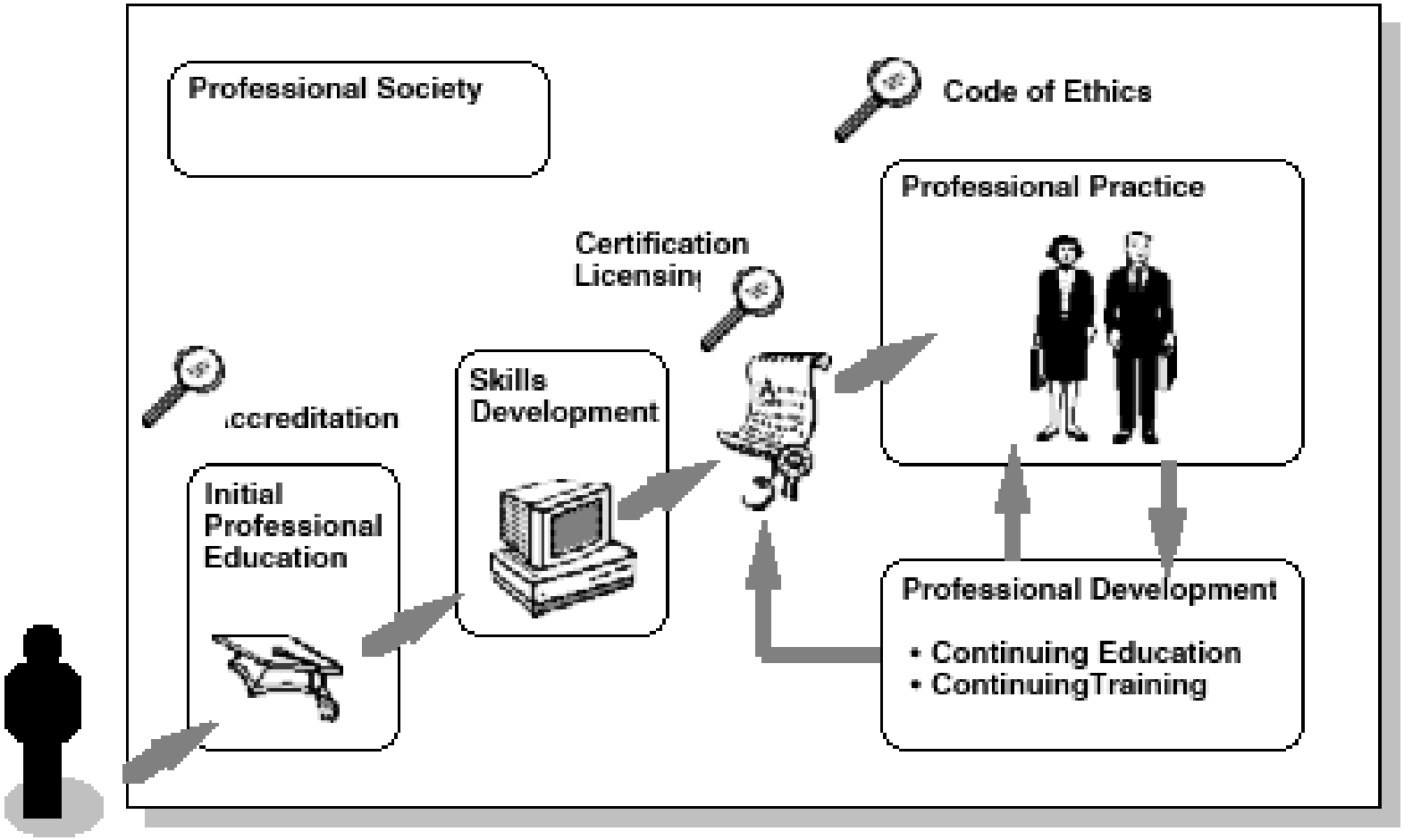
A **profession** therefore operates at two levels:

- **practitioner level**: professionals, knowledge, professional practice.

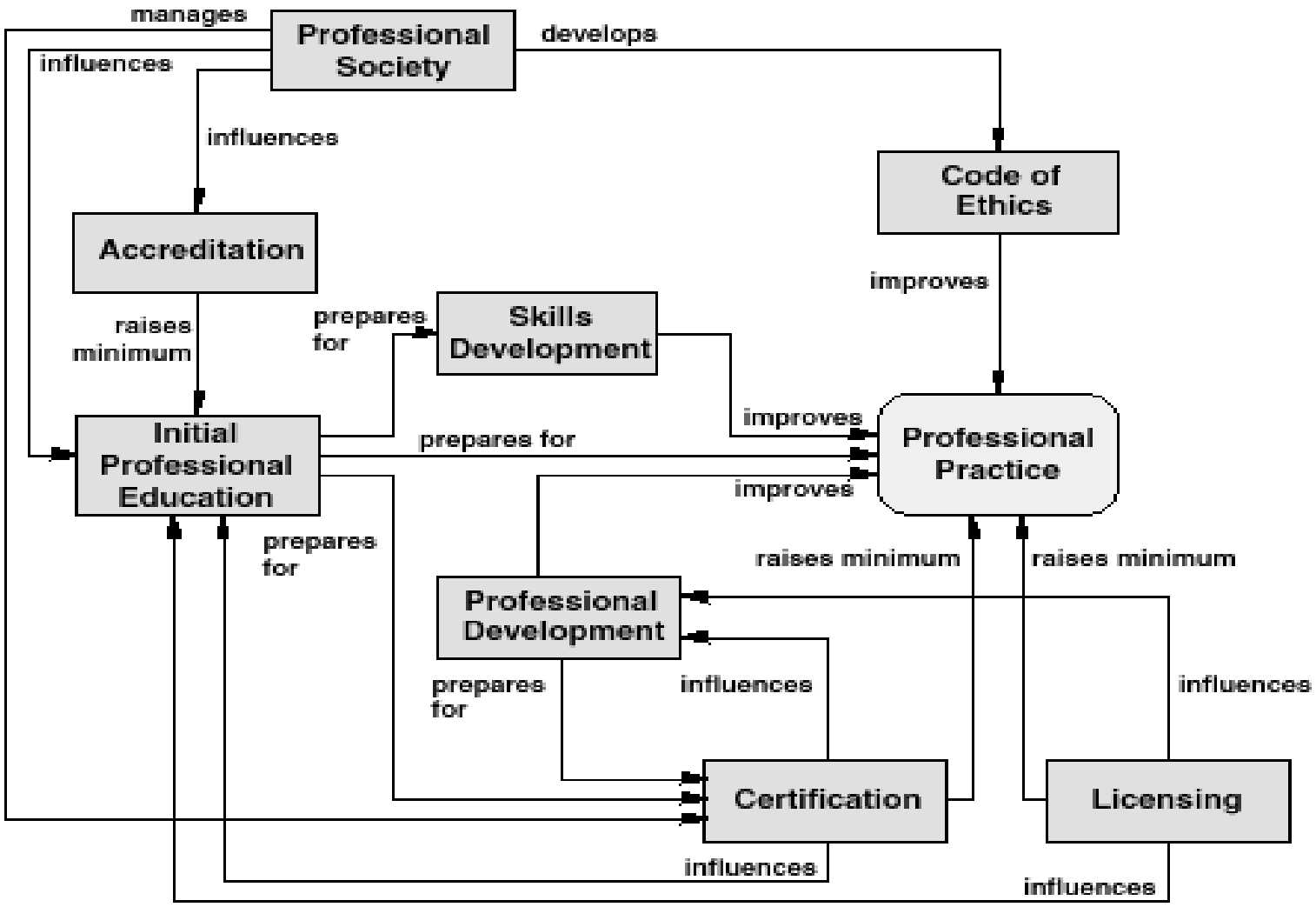
  A practitioner is someone who engages in an occupation, profession, religion, or way of life. (from Wikipedia)

- **infrastructure level**: initial professional education, accreditation, skills development,certification, professional development, code of ethics, professional society.

Infrastructure-level components of a profession



Interactions among the components of a profession



Basic technical competence

A professional computing scientist must have

- a **firm foundation** in the **crucial areas** of the field and
- an **in-depth knowledge** in one or more other areas of the discipline, depending upon the person's particular **area of practice**.

A well-educated computing scientist should be able **to apply** fundamental **concepts and techniques** of

- **computation**,
- **algorithms**, and
- **computer design**

to a specific design problem.

Continuing professional development

Being a **professional** means:

> "The **systematic maintenance**, improvement and broadening of **knowledge** and **skill** and the development of personal qualities necessary for the **execution** of professional and technical duties throughout the individual's **working life**"

Quality

The work of a **computing professional** includes

- **detailing specifications and analysis of a problem**, and
- providing a **design that functions** as desired.

In addition, the output must have

- **satisfactory performance**,
- be **reliable** and **maintainable**,
- and meet desired **cost criteria**.

Impact on society

A computing professional must not only have sufficient training in technical areas to be able to accomplish the above tasks, but also be educated to understand the **implications on society** of the work being performed.

Professional bodies

Being a professional means being a member of a professional body.

In the **UK** this means:

- **Institution of Engineering Technology (IET)** http://www.theiet.org/
  (previously, Institution of Electrical Engineers (IEE))
- **BCS, The Chartered Institute for IT** http://www.bcs.org/

In the **USA**:

- **Association for Computing Machinery (ACM),**
- **Institution of Electrical and Electronic Engineers -Computer Society (IEEE-CS)**

are membership computing interest organisations NOT professional bodies per se,
the **IEEE** itself is a professional society

Science vs. Engineering

As far as UK is concerned - the computing profession is mainly treated as **engineering**!

The BCS describes itself as Chartered Institute for IT.

The UK has probably the most mature scheme for handling professional qualifications for computing, based on the scheme for professional engineers.

Recent change due to the **Science Council** being set up with the notion of **professional scientists**.

Professional Membership

A form of membership for institution is **accreditation**.

A **University** can apply for its degrees to be accredited by the BCS for **chartered status**. BCS have recently separated professional membership (**MBCS**) from chartered status (**MBCS CITP** – Chartered IT Professional).

Chartered (of an accountant, engineer, librarian, etc.) qualified as a member

of a professional body that has a royal charter (The Apple dict.).

Accreditation process: To get accreditation, every **5** years, a university sends a documentary submission to the BCS and a 4-5 person **panel** of assessors then visits the University. Their report goes to the BCS **Academic Accreditation Committee**.

A **Stirling Honours Computing graduate**

- is **qualified to be** an MBCS, and
- has the **academic qualifications** for CITP.

  To become a CITP, an applicant requires further professional experience.

Professional bodies - registration

The register of **professional engineers** is maintained by the

Engineering Council

who agree the

UK Standards for Professional Engineering Competence
(UK-SPEC).

Suitably qualified people can be registered to be a

Chartered Engineer (C.Eng).

Accreditation for C.Eng/I.Eng

The **Engineering Council** set up the rules and regulations for **I.Eng** (Incorporated Eng.) and **C.Eng** accreditation.

They then delegate the task to the professional societies to administer.

In the case of computing, this is the BCS and the IET.

Accredited degrees (like those from **Stirling**) give **partial accreditation** towards C.Eng.

Professional experience and further study required on top of the academic qualifications.

Accreditation for C.Sci

Recently, the government has set up a **Science Council** and there is a register of **Chartered Scientists**.

Accredited degrees can also give **partial accreditation** towards **C.Sci**.

That is the case with the **Stirling Honours** degrees in

- Computing Science,
- Software Engineering, and
- Business Computing.

Again, **professional experience and further study** required on top of the academic qualifications.

Why is it important to be a Professional?

Recognition by

- peers,
- clients,
- external bodies,
- public.

Continuing professional development.

Preservation of qualification standards.

Lobbying.

Contracts and networking.

"Closed-shop" effects.

Support for, and access to, learned society activities.

Financial and other services (insurance, etc.).

Professional register.

What is Ethics?

The **systematic study of morals**.

Deals with uncertainties and conflicts of opinion over matters of what is right and wrong conduct.

Ethical conduct is “doing the right thing”.

Ultimately a personal matter (hence our seeking to raise awareness)

- though there are external standards which can assist in deliberation over ethical concerns.
- ... this may especially apply to specific contexts like a profession

Ethical conduct

There are no universally acceptable reasons for ethical conduct:

- **Trust**: an individual known to work within a consistent ethical framework is one who can be relied upon
- **Duty**: because it is the right thing
- **Security**: being aware of the consequences of your actions can guard against unexpected outcomes
- **Comfort**: peace of mind
- **Fear**: there may be sanctions imposed on those who act unethically

Professional Codes

Formal expression by professional organisations of the expectations and requirements they have of their members.

Related to the regulations of practitioners -- one of the defining characteristics of professionals.

This does NOT mean that they are only relevant to the members of that organisation.

See the **Code of Ethics/Code of Practice** of the various computing societies.

Professional Codes

Example: from the **BCS Code of Conduct (**http://www.bcs.org):

Any **breach of the Code of Conduct** brought to the attention of the Society will be considered under the Society's Disciplinary procedures. You should also ensure that you notify the Society of any significant violation of this Code by another BCS member.

1. **The Public Interest**

   ...

   3. You shall ensure that within your professional field/s you have knowledge and understanding of relevant legislation, regulations and standards, and that you comply with such requirements.

   * As examples, relevant legislation could, in the UK, include the Public Interest Disclosure Act, Disability Discrimination Act, Data Protection or Privacy legislation, Computer Misuse law ...

2. **Duty to Relevant Authority**
3. **Duty to the Profession**

Campaigning on Ethical Issues?

The BCS has an **Ethics Expert Panel** whose purpose is to provide advice and guidance on ethical issues.

Should the BCS be pro-active and decide what is of benefit and what is potentially damaging to the public good and then push for legislation?

Problem is that people will have different views on what is potentially damaging, e.g. ID cards.

Campaigning on Ethical Issues?

However, although an action may be **unethical**, that does not necessarily mean it should be **illegal**.

In some areas there will be general agreement about what is wrong.

Hence campaigning for anti-SPAM legislation would have wide support.

Another approach is to say that professional societies should control the behaviour of their members and that all IT Practitioners in the UK should be licensed by the BCS.

Discussion at: www.bcs.org/server.php?show=ConWebDoc.2957

Summary

Professionalism is about education, training, experience and accepted standards of practice

A recognised framework of qualification is provided by the professional institutions and the Engineering and Science Councils

Your professional development continues beyond University