XOOTIC Survey 1994

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Recently a thorough questionnaire has been send out to all XOOTIC *members, containing questions regarding the OOTI curriculum, their current job, and the relation between these two. This article reports on the results of the 1994 edition of what seems to become an annual tradition: the* XOOTIC *Survey.*

Having in mind the results of the XOOTIC Survey 1993 (see XOOTIC MAGAZINE September 1993) the board of XOOTIC has decided to strive for regular surveys under its members. The motivation is that such surveys show facts and trends that are of use for the following purposes.

- Advising the Designers Course Software Technology (OOTI), e.g., through its External Advisory Board, about the following subjects.
  - The ex-OOTI job profile.
  - Contents of the OOTI programme.
  - Trends, tools, and methodologies used in industrial environments.
- Possible cooperation between XOOTIC and OOTI.
- Advising of OOTI and related institutes about ex-OOTI needs for additional education, support, etc.
- Collecting feedback about and suggestions for the activities of XOOTIC.
- Reporting interesting aggregated information about OOTI graduates to the members of XOOTIC.

Organization and action plan

After the annual XOOTIC meeting (the so-called *X-Day*), the XOOTIC Survey 1994 committee has been formed, consisting of the following four XOOTIC members: drs. Martin Diepstraten, ir. Henk Eemers, ir. Alex Jansen, and drs. Michiel van der Korst. It has been agreed that dr.ir. Marloes van Lierop, coordinator of OOTI, would cooperate in the survey programme since the results of the survey are of high importance to OOTI.

An important aspect of the survey is that ex-OOTIs have two opportunities to provide input.

1. By completing and returning the survey questionnaire (August 1994);
2. By taking part in a discussion on the results of this survey to be held at the XOOTIC meeting of September 23, 1994 (announcement: see the agenda of this XOOTIC MAGAZINE).

Questionnaire results

24 of the 41 distributed questionnaires have been returned (59%). In the remainder of this article the main results of the survey are presented. Attention is paid to the following four subjects.

1. Ex-OOTI job profile (which company, which function, which tasks, which employment conditions?).
2. Use of OOTI programme for current ex-OOTI job.
3. Ex-OOTI needs for additional education.
4. Feedback about, and suggestions for XOOTIC activities.

Ex-OOTI job profile

The job profile part of the survey investigated where ex-OOTIs work and what they do, now as well as in the near future.

Where?

In comparison to the outcomes of the ex-OOTI survey of 1993, which indicated that a majority of the ex-OOTIs worked in the research domain, it is clear (see Figure 1) that the shares of software engineering companies and electronics industries have grown, although a fair share of research business remains. 71% of the ex-OOTIs is employed

in a company larger than 100 persons.

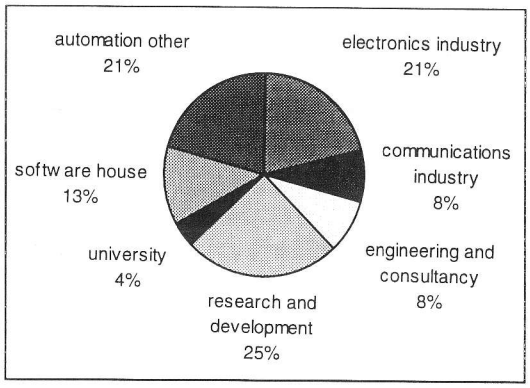


Figure 1: Branch distribution

Most ex-OOTIs work in a research and development or software engineering department. The remainder of the ex-OOTIs work in sales departments, consultancy departments, or small companies without specific departments. The main disciplines an ex-OOTI is confronted with in the department or on the job are computing science, electrical engineering (in more than 50% of the cases), mathematics, economics/econometrics, logistics, and social sciences.

Function

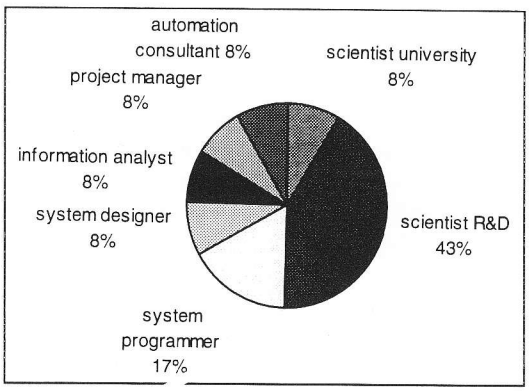


Figure 2: Ex-OOTI job tasks distribution

Similar to the department subdivision, the majority of the functions is distributed between R&D and software engineering functions on a fifty-fifty basis (see Figure 2). When looking at the tasks (cf. Table 1) it is clear that the ex-OOTI has a diversity of tasks. Large shares are reserved for software engineering tasks such as analysis, design, coding, and testing; together they account for 64% of the ex-OOTI's daily tasks. Other tasks of considerable size are applied research (11%) and consultancy support (10%). In comparison to the 1993 survey a clear shift from research tasks to software engineering tasks has occurred, although a considerable share for applied research remains. Almost everybody returning the questionnaire indicated to have applied research tasks, even the ex-OOTIs employed in the software engineering business.

In general it can be concluded that the OOTI curriculum very much resembles the task shares as result from this survey, and that there is no need to revise the main subdivision of the OOTI programme.

Task	Current job	Next job
information analysis	5%	8%
system analysis	11%	13%
system design	19%	18%
coding	20%	10%
testing	9%	4%
general/project mngmt	9%	18%
instruction/training	2%	2%
consultancy/support	10%	12%
applied research	11%	13%
marketing	3%	4%

Table 1: Ex-OOTI task distribution

Most of the ex-OOTIs have a high job satisfaction ratio (7.3 on a scale from 1 to 10) in their current job.

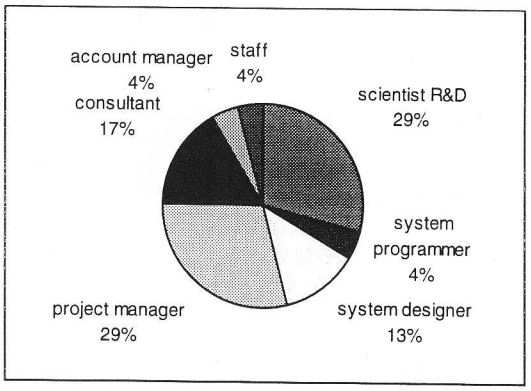


Figure 3: Desired ex-OOTI next job

When considering the preferred task shares an ex-OOTI expects from his next job (see Figure 3

and Table 2) a shift from coding and testing to analysis and design can be observed. Also the share of more general non-technical activities such as (project-)management, marketing, etc. grows. Note that the share of applied research activities remains considerable.

Salary and employment conditions

In Figure 4 the current distribution of ex-OOTI salaries is depicted. Note that the salary overview results from a survey between ex-OOTIs who graduated only a few months ago up to others who are employed for four years. A significant part of the ex-OOTIs is employed on basis of a short-term contract (50%).

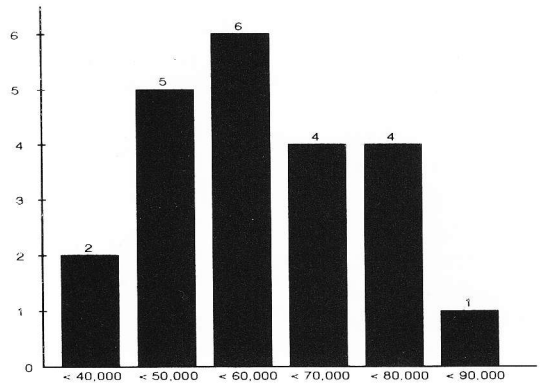


Figure 4: Ex-OOTI salaries (gross salary in Dfl, N = 22)

Benefits in current job

In Part 1 the focus is on the ex-OOTI job profile (function, tasks, branch). In this part the practical use of the OOTI programme elements for the ex-OOTI job are investigated. The following curriculum elements are taken into account.

- Software engineering block (includes the workshop).
- Formal methods block.
- Design project.
- Optional blocks:
  - homologation phase;
  - logistics;
  - laboratory automation;
  - discrete manufacturing;
  - VLSI.

In Table 2 the ex-OOTI's appreciation of the use of the programme blocks is depicted (on a scale of 1 to 5). Attention is paid to two aspects.

1. Use of block for current job.
2. Use of block for multi-disciplinairy development.

The appreciation for the software engineering is very high, especially for the 'workshop' construction. The only criticism is directed towards the subject of the workshop: it should be more practical (development of a real embedded system) and executed in a real business environment. Also more attention should be paid to an overview of methods and tools commonly used in the software engineering business.

The design project also scores quite high, although almost all ex-OOTIs add the following requirements that should hold for a design project.

- External, in an industrial or business environment.
- Working in a team.
- Responsible for the complete development process.
- In cooperation with other non-computing science disciplines.

It turns out that almost all other blocks score relatively low, although the appreciation for multi-disciplinairy development is high (with the exception of the homologation block). In order to enlarge the practical use of these blocks the following suggestions are given.

- Strive for an integrated approach in which the coherence of the education is realized by means of a joint business-oriented exercise.
- Pay more attention to the combination with automation aspects.
- Pay more attention to a broader scope of electrical engineering subjects than VLSI and laboratory automation only, since the majority of the ex-OOTIs is involved in the development of embedded, telecommunications, consumer electronics, command and control, sensor systems, etc.

OOTI programme block	Practical use	Multi-disc. dvlpmnt
software engineering	3.8	-
formal methods	2.4	-
designers project	3.6	3.5
logistics	2.6	4.2
VLSI	2.6	3.2
laboratory automation	2.6	3.2
discrete manufacturing	2.2	3.9
homologation	2.0	2.5

Table 2: Ex-OOTI appreciation for OOTI programme blocks (scale of 1 to 5)

When considering business culture aspects it turns out that the shift from OOTI to business did not lead to complaints about an enormous culture gap in way of working or in a way of cooperating with other department members. High appreciation is given to the non-technical courses, such as Communication, Technical Writing and Editing, and other courses directed towards general development.

Additional education

The survey results (see Table 3 indicate that a lot of interest exists among ex-OOTIs for additional computing science education (54%). There also is a significant interest for personal effectiveness education and career development programs.

Course	Interest
Computing science	54%
Other technical sciences	46%
Management	54%
Negotiating	58%
Conflict management	38%
Brainstorming	38%
Career development	37%

Table 3: Education interests

XOOTIC activities

High appreciation is given to the contents of the XOOTIC activities (3.8 on a scale of 1 to 5) and frequent use of XOOTIC is made in order to meet other ex-OOTIs (3.5 on a scale of 1 to 5). The main reason for non-frequent visits to XOOTIC activities is the location of the activities, which is mostly Eindhoven, whereas a large part of the ex-OOTIs is employed (and therefore lives) in other parts of the country.

The following suggestions are done for future XOOTIC activities.

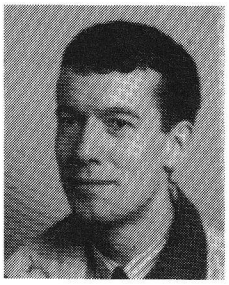
- XOOTIC news group on Internet.
- XOOTIC network or XOOTIC employment database.
- XOOTIC workshops or study groups.
- XOOTIC symposia.

Future

The results presented in this article will be used in discussions with the members of XOOTIC, the staff of the OOTI programme, and the External Advisory Board of OOTI. One of the outcomes, among others, of these discussions will be advice w.r.t. improvement of the OOTI curriculum.
In the future, regular surveys will be held among the members of XOOTIC to obtain insight into the development of ex-OOTIs in business and industry. Furthermore, these surveys will be used to give feedback w.r.t. the contents of the OOTI programme.

Acknowledgments

The survey committee would like to thank Mrs. Corry Kolk of the OOTI secretariate for her invaluable help during the preparation and distribution of the survey. □



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