

Regular Course Offers for Women in a Coeducational Academic Informatics Programme

Susanne Maaß, Veronika Oechtering, Karin Vosseberg, University of Bremen

Currently, three academic institutions of the federal state of Bremen offer various programmes in informatics. The universities of applied sciences offer technical informatics, applied informatics and have included media informatics (Bremen University of Applied Sciences) and informatics/economic informatics (Bremerhaven University of Applied Sciences) into the curriculum only recently. The University of Bremen offers the diploma programme informatics and the newly established BSc/MSc programme media informatics. The share of women in these programmes lies between 4.5% (technical informatics) and 30% (media informatics).

Since 1998 a two-week annual summer programme for women in informatics has been held within the range of the project Informatica Feminale at the Department of Mathematics and Informatics at the University of Bremen. The programme offers courses in informatics by female lecturers from science and practical work and is primarily directed to female students in informatics as well as to interested women with corresponding knowledge (see Oechtering & Vosseberg 99).

In their coalition agreement, the political parties SPD and CDU in Bremen stipulated that "an academic programme of informatics for women will be established in one of the academic institutions in Bremen" (coalition agreement 1999). With the intention of realising this resolution in a constructive and co-operative way, representatives of the informatics' programmes in Bremen, the Equal Opportunities Officers of the Universities of Applied Sciences of Bremen and Bremerhaven and the University of Bremen met last autumn for a "round table" under the moderation of Bremen's Federal State Equal Opportunities Officer. Here, an outline was drafted how the concerning academic institutions could generally realise "women-oriented studies in informatics" by a range of mutually agreed measures in the federal state of Bremen. Here, the expertise of the project Informatica Feminale is supposed to act as a guideline. While an international programme of informatics for women is intended to be established at the Bremen University of Applied Sciences (see Viereck 99, Meyer-Braun 99), the coeducational programmes at the Bremerhaven University of Applied Sciences and the University of Bremen are intended to be optimised by additional attractive course offers for women. Finally, the measures to be taken in all informatics programmes are aiming at realising a significant increase in the share of women among students.

1. Study Reform and New Target Groups

The dynamic development of computer technology and its applications creates a permanent need for continuous curricular development in informatics. The establishment

of new programmes like economic or media informatics that at the same time approach new target groups of students represents the most radical way into this direction.

So far, the informatics programmes principally attract young men who have already been interested in natural sciences and mathematics as pupils and of whom many have already gathered considerable experience in computing in their leisure time. In the meantime the inner disciplinary discussion about study subjects in informatics and abilities the students are supposed to achieve for a successful career has named a number of educational deficits. Those deficits can especially be found in communicational and co-operational capabilities: the development of task-oriented software for different fields of life requires not only the understanding of these fields but also the co-operation with users and the capability to listen and communicate (see Pressman & Herron 1993, Lederer & Prasad 1992). The corresponding aspects should be emphasised in education and be portrayed as relevant to the public. Thus, the rather technical-scientific image of informatics would be enriched and chances are that it will attract young people with more than just technical competencies and interests.

In the past years several projects have been performed on a governmental and federal level where the focus was on women as a target group (an overview of these projects is included in Oechtering 1998). These projects focussed on various aspects of university studies that represent special obstacles for women. After the projects' conclusion the reform measures were seldom integrated into the regular curriculum. By establishing new regular course offers for women in the coeducational informatics programme at Bremen University it is now intended to reform all phases of the informatics studies according to the interests of women, thus attracting more women on a permanent basis.

When referring to the target group "women" in the following, we would like to emphasise that the spectrum of men interested in informatics' programmes ought to be enlarged, too. Our measures for academic study reform are explicitly designed for the purpose of women. However, after their first deployment it should be checked which incentives for improving the curriculum and the overall study conditions they may offer.

2. Women as Addressees of Additional Course Offers

Men and women have different motives for beginning to study informatics. Britta Schinzel and her co-workers determined in a nation-wide empirical study (Schinzel et al. 1999, pp. 17) that the main reasons given by male students were their interest in the subject and their talent for informatics. However, apart from interest and talent the main reasons given by female students were the variety of career possibilities and the prospects of a secure job. According to Schinzel, this may be due to the fact, that women decide to study informatics "out of very rational reasons" and very often this decision is made after they left school. This result is confirmed by inquiries among female students studying informatics for the first semester in Bremen. Every academic year sees a significant share of women having already undergone a professional training or a change in the academic discipline.

When planning attractive courses in informatics women have to be perceived and regarded in their diversity (Martin & Murchie-Beyma 1992). With this, differences between women and in contrast to male students of informatics are referred to. In order to appeal various groups of women it seems especially important to consider new aspects of the curriculum in relation to

- their differently developed former interest in technology and their experiences so far, e.g. experience and know-how acquired by using computers, by lessons in informatics or more general school subjects like mathematics, physics, experiences gained in technology-related vocational training or even work experience (see Beermann et al. 1992, Funken et al. 1996, Westram 1999),
- the more or less significant time span between graduation from school and the beginning of the studies in combination with the different styles of learning, learning interests and knowledge e.g. in mathematics (see Schütt & Lewin 1998, chapters 6 and 15),
- their additional knowledge and interests, which are reflected by their frequent choices of school subjects like languages, the arts and social sciences or the scientific school subject biology or by their primary study subjects at university (see Schütt & Lewin 1998, chapters 8 and 9),
- various experiences in male-dominated learning/ teaching and working situations,
- different experiences in mono-educational course offers for women, e.g. experience in separate school lessons for boys and girls that is only seldom gained by visiting a girls' school, in computer courses for girls/women (Funken et al. 1996, Westram 1999) and
- the different financial and private situations like e.g. the necessity to finance the studies by jobbing or to study part-time due to the family-related reasons(see Schütt & Lewin 1998, chapters 8 and 9).

Only a few of these aspects have so far been considered when women are to be interested in informatics programmes or when new curricula are to be outlined. Women only accept additional or special course offers, if these represent a chance to eliminate deficits in knowledge or if the presented topics are especially attractive to them. This has been outlined in research regarding co-education and gender separation in natural sciences and technology. It has been confirmed by the project Informatica Feminale for the field of informatics. Our planned additional or special course offers are supposed to be chosen by women according to their individual prerequisites and interests.

3. New Course Offers to Women

In the following, five bundles of measures will be described that are intended to supplement the course offers in the informatics programme at the University of Bremen.

They are based on the status quo in Bremen and take up current reform discussions. The initiative is supported by the university headquarters.

New Course Offers to Women in Informatics

1. Connecting informatics to further application subjects in the undergraduate programme
2. Interdisciplinary lecture projects in the graduate programme
3. New concepts to introduce practical informatics and mathematics
4. Integrating the summer programme of Informatica Feminale
5. Connecting university studies with student job interests

3.1 Connecting Informatics to Further Application Subjects in the Undergraduate Programme

Informatics is still a very young discipline with many interdisciplinary elements and offering widely secure future prospects on the job market. The academic informatics programme in Bremen¹ puts great emphasis on its application orientation and deals with the interlocked development of technology, work, politics and culture in research and education. The discipline integrates subjects regarded at other universities as subsidiary subjects under the heading of "applied informatics".

So far, the discipline consists of three integrated application subjects ("Fachinformatiken") are well established in the informatics programme. Academic lecturers from informatics offer courses on media informatics, business informatics and production informatics, teaching basic criteria, models and methods of the respective relevant sciences in combination with basic questions of computer support and presenting exemplary application systems. The three "Fachinformatiken" are framed by further general, introductory lectures as well as special lectures related to software development. Students are free to choose a different application subject and study it thoroughly. However this option is rarely chosen. Therefore, the enlargement of students' choices with respect to application subjects was recommended by the evaluators of the informatics programmes in the Nordverbund² (see evaluation report (Arbeitsgruppe Evaluation der Lehre 1995)).

Here, we have a good starting point to integrate subject-related interests by women into informatics. The co-operation between such university programmes with an especially high share of female students thus emphasising a subject-related study interest of women is to be cultivated as a special offer for women. Together with programmes from medicine and health science, educational science, cultural studies and social science or for example the biology programme from natural sciences attractive combinations of

¹ In the following, "informatics" does always have the meaning of "academic informatics programme"

² The "Nordverbund" refers to universities in Germany's northern federal states Bremen, Hamburg, Schleswig-Holstein, Lower Saxony and Mecklenburg-Vorpommern intending to establish the academic discipline of informatics for women only.

subsidiary application curricula for both sides might be developed. Considerably large parts of courses in the application subjects ought to be accompanied by lecturers from informatics (two lecturers for each course, preferably women). Only female students from informatics and the co-operating programme ought to be eligible.

Thus, not only interesting alternatives for the existing "Fachinformatiker" will be created but female students of the subsidiary programmes will be brought into contact with informatics and might possibly be attracted to further studies of informatics.

3.2. Interdisciplinary Projects in the Graduate Programme

For their graduate studies at Bremen University students of informatics take part in a four semester project. "Thus, the students shall be given the opportunity to analyse a given task, specify it, apply the learned scientific methods for solving it and present the results according to scientific demands." (Curriculum Guide 1998, p. 13) In most cases the project topics result from the research focus of the lecturers. Therefore, the lecturers also decide, whether the focus of the studies goes beyond informatics. In principle, interdisciplinary projects are desirable. At the end of 1997 an internal work group which evaluated the projects concluded that interdisciplinary co-operation with experts and users from non-informatics disciplines and the integration of students from other programmes into the informatics projects should be intensified (see evaluation report (Arbeitsgruppe Evaluation des Projektstudiums 1997)).

Topics of projects are analysis, planning, design, introduction and evaluation of computer-based systems and processes. Up to 20 students work in subgroups on special tasks according to the more general project topic and participate in relevant seminars and courses. Mutual information, planning and arrangements are realised in the project plenum. As part of the new regular women's only course offers female graduate students will profit from cooperations which will be built up for undergraduate studies. The graduate programme will set up women's only interdisciplinary projects with the above mentioned disciplines. During a testing period of 4 to 5 years several interdisciplinary projects with various disciplines could thus be offered. Because their content and structure will have to differ from usual informatics' projects female students might choose such mono-educational offers particularly according to their subject-related interests.

All project courses should be held by two lecturers from the co-operating disciplines. The female participants should come from both disciplines, too. Thus, female students and lecturers of the respective disciplines become visible for each other and will slowly develop their own interdisciplinary exchanges. Later this co-operation might extend to the theses.

An important goal of projects is to develop abilities for team-oriented work. Working in interdisciplinary teams is an important job feature for informatics' specialists. It remains to be studied to which extent this goal is indeed achieved in projects. Experiences in

Bremen emphasise that the success of student projects depends especially on group-related processes. However academic staff is not prepared systematically for the didactic component of their academic career. Some attend lectures in didactics, but otherwise, personal good or bad experiences become the basis for didactic decisions. The evaluation report of the Bremen work group on students' projects indicates this problem area, too.

To achieve the learning effects intended by the projects an improved support in preparing the lecturers is required. Especially while mentoring group-related processes lecturers ought to be able to register and react to gender-related phenomena. Lecturers and student tutors should develop an awareness for unequal communication situations that are among other things characterised by gender relations and they should learn how to deal with them. School research has repeatedly proved that good intentions will not suffice in this respect and a purposefully didactic further education or supervision is necessary (Kreienbaum 1999, Nyssen 1994, Nyssen 1996, Volmerg et al. 1996). The same applies to adult education (Derichs-Kunstmann et al. 1999). At the Berlin University for Applied Sciences and Technology first steps were taken to combine university didactics with gender-specific working methods at university (see Erlemann 99).

With the intended introduction of interdisciplinary women's projects more attention should be paid to project communication. A comparative study of coeducational and mono-educational projects may indicate problem areas and possibilities for improvement.

3.3. New Concepts to Introduce Practical Informatics and Mathematics

Undergraduate studies in practical informatics and mathematics are to be examined as further reform areas within the framework of new regular course offers for female students. The goal of the new concept is to acknowledge women's different prerequisites with respect to their mathematical, programming-related and practical computing experiences.

While evaluating Informatica Feminale it became evident that lacking programming experience results in problems for female students in their undergraduate studies. The need for programming courses was considerable. In 1998 more than two thirds of the registered female students wanted to take part in the only offered programming course. Six programming courses were offered in the second summer programme of Informatica Feminale, but the request was again bigger than the offer. From such programming courses female students did not expect to learn the syntax of "the most modern programming language" but to acquire systematic programming abilities: How to approach a problem, how to convert the problem into a special language, to what extent does a programming environment help to check a solution? Additionally, they were interested in systematic categorisation of the particular language with respect to different programming paradigms: How do programming concepts and language concepts match?

A new introduction to practical informatics could be derived from the concept "Introduction to Interactive Programming" (Stein 1999) developed by Lynn Andrea Stein at the MIT within the framework of the "Rethinking CS101 Project". This approach was already practised in Germany and Sweden by the informatics professor Debora Weber-Wulff from Berlin (Weber-Wulff 1999). Also at the summer programme 1999, it got a very positive reception. As other international experiences show especially students with little programming practice get along with it very well. A characteristic of this approach is that student performance is evaluated not only on the basis of the written code but also on the basis of descriptions of the attempted solutions and the related argumentation.

Not only their lacking programming knowledge and experience leads to problems for female students, but also the lack of introduction to general of infrastructure, e.g. the use of Unix or the Internet services. Informatics' programmes do not offer a sufficient number of courses in this regard although such knowledge is crucial for further academic studies.

The outlined reform project shall offer courses exclusively for women in order to compensate for different prerequisite knowledge. The new kinds of introductory courses to practical informatics are to be offered mono-educationally for women in parallel to the standard courses.

Undergraduate studies in mathematics may cause great problems for male and female first year students especially if they have started with university years after they left school. Furthermore, maths classes taught in school were sometimes very different from mathematics at university. In addition one should bear in mind that not many women of those we want to attract will have chosen mathematics as a main subject in school. A preparatory course in mathematics or a special (re-)introductory course for women might help female students over their first year.

During the summer programme of Informatica Feminale in 1999 new math course concepts were tried out. Working on exemplary topics from mathematics and theoretical informatics they asked: "What does mathematics achieve? Where are its borders? What makes a good definition and a good proof? What kinds of definitions are useful and what for?" This way students were taught a general approach to mathematics and got convinced of its fundamental necessity for their studies. Numerous didactical and methodical hints for math education can be found in a publication from Hanna 1996. Realising these measures requires a close co-ordination with colleagues from mathematics. In Bremen the prospects for such co-operation are positive due to the fact that of the two disciplines mathematics and informatics are located in one department.

3.4. Integrating the Summer Programme of Informatica Feminale

To offer mono-educational courses to women over a broad variety of topics and for all phases of the studies, it will be necessary to continue the summer programme of Informatica Feminale as a regular curricular offer. Already for the past two years female first year students in Bremen used parts of the summer programmes as preparatory courses. But still many offers could be enlarged with regard to the approach of new

target groups of women. Parts of the summer programme have already been formally integrated into the regular informatics programme in that credit points are awarded for its courses.

At the same time the summer programme's open concept will help to counteract the study culture in informatics that excludes women (see Schinzel et al. 1999). In the intensive co-operation with many different female lecturers (university lecturers, professors and scientists, women working in informatics and competent female students) students get to know different role models and get opportunities to exchange experiences on different study situations and places of study. Lectures delivered by women working in industry, special lectures on careers' guidance held by careers' advisers, and special job markets with computing companies provide many ideas to female students to evaluate their own chances on the labour market. Future summer programme should offer even more courses on this.

Finally, the summer programmes create room for women to discuss about technology among themselves and free from gender-specifically pre-structured expectations and assignments. In study and working life this kind of discussion takes place under the critical observation of male fellow students and colleagues. At the same time such discussions represent a considerable amount of the everyday talk especially in informatics.

Informatica Feminale gives female students the possibility to get acquainted with mono-educational learning situations without any obligation. Many attendants reported no previous experience with women's-only lectures. They decided to attend the summer courses because of the attractive topics offered and in spite of the mono-educational learning situation. After a few days they were generally satisfied with the unusual but constructive learning situation they experienced. At the end of the two weeks of summer programme students named the mono-educational learning situation as a primary reason for attending again in the following year. An evaluation showed that the students achieved an increased self-confidence for their continuing studies at their home universities and they actually used it in mixed-gender work groups explicitly, calling for equal co-operation with male fellow students. Therefore, it is to be expected that female students in Bremen will benefit from Informatica Feminale and in future will decide in favour of other mono-educational study offers, too.

3.5. Connecting University Studies with Student Job Interests

Male students of informatics tend to have more previous computing experiences than female students, and thus have an advantage while tackling the first phases of their studies as well as securing their living from the beginning of their studies. Money remains a major problem for many female students during their undergraduate studies.

The majority of today's informatics students only study part-time. This does not match with officially planned study organisation. Relatively well-paid jobs impede studying for university and often lead to dropout. Many students assume that their jobs in the media or data processing areas correspond in many ways to what they will do after graduation.

But the installation of standard software, users consulting and programming according to instructions represents just a minor part of qualified informatics-related activities. So far, there has been no systematic assessment of students jobs and of the ways in which the experiences they gain supplement the specialised knowledge they achieve in academic studies.

Such an investigation of student side jobs should be carried out at least for Bremen and should especially pay attention whether patterns occur that are different for male and female students. Based on such an investigation women are to be purposefully supported and advised while searching and deciding for a side job , so that it will supplement their informatics' studies in a useful manner.

Practical job experiences should become a topic for seminars on professional orientation, where these experiences could be discussed and evaluated together with invited informatics experts. External lecturers and guests can illustrate the variety of professional activities in informatics and point out the relations between academic subjects and their practical application.

During graduate studies lectures on how to start up a small company could be offered especially to women. Today, this question becomes relevant for informatics' students very early. Methods of positive self-presentation ought to be taught and practised in this context, too. This is particularly important for women who – according to empirical studies - tend to underestimate their own capabilities despite a good exams (in relation to informatics see Schinzel et al. 1999).

4. Summary

Numerous factors determine, whether women can be convinced to study a technical disciplines. Even if the academic institutions have no influence on many issues in this context, a lot must be done in the respective disciplines. The discipline of informatics is still relatively young and was more attractive to women when it was established in West Germany in the early seventies than it is today: more than 20% of all first year students were female. In the meantime, informatics has achieved a technical image and in school boys have taken it over as *their* subject. Technical competence matches the social image of masculinity. Women with interests in technology must free themselves from this stereotype. Many women succeed in doing so only after they have left school and have decided for a career without technological relations. These potential candidates for informatics are to be addressed, they have to be integrated with all their differing knowledge and experiences.

For this reason we suggest to realise regular course offers to women within the framework of a coeducational programme in order to compensate the widespread deficits in mathematics and programming and to meet women's broad interests in informatics *and* other disciplines. The courses offered in the summer programme of Informatica Feminale are an important part of this initiative.

Experiences in introducing special study offers for women show that some further aspects of implementation are to be considered for a long-term success:

Professional marketing is necessary to point out the planned measures for study reform for women. Goals and activities must become visible inside and outside the university for example by means of press and public relations' materials. The integration of companies with a credible interest in good female graduates is another very useful factor. As a consequence, women with many interests may feel welcome as students and professionals in informatics, and therefore they may accept the special course offers.

The planned measures for programme reform activities cannot be realised by the women in the department alone. Female and male lecturers as well as male students have to be involved. It is especially important to create an awareness of different prerequisites and approaches to an informatics programme that does not exclude anyone. The described options for reform in a coeducational and women-related informatics programme refer to areas where changes will effect benefits for all students in the long term.

References

Arbeitsgruppe Evaluation der Lehre (ed.): Stolz können wir auf manches sein, zufrieden nicht mit allem. Selbstbeschreibung des Studiengangs Informatik der Universität Bremen im Rahmen der Evaluation von Studium und Lehre des Verbundes norddeutscher Hochschulen. Universität Bremen, Fachbereich Mathematik/ Informatik, September 1995.

Arbeitsgruppe Evaluation des Projektstudiums (ed.): Diskurs über das Projektstudium der Bremer Informatik. (internes Papier). Universität Bremen, Fachbereich Mathematik/ Informatik, Dezember 1997.

Lilly Beermann, Kurt A. Heller, Pauline Menacher: Mathe: nichts für Mädchen? Begabung und Geschlecht am Beispiel von Mathematik, Naturwissenschaft und Technik. Bern [u.a.]: Verlag Hans Huber 1992.

Christiane Erlemann: Aspects of University Educational Reform that Advance Women – A Custom-Made Concept. Regular Course Offers for Women in a Coeducational Academic Informatics Program. In: Bundesministerium für Bildung und Forschung (Hrsg.): Frauenstudiengänge in Ingenieurwissenschaften und Informatik – Chancen für die Zukunft, Dokumentation der Fachkonferenz vom 14./15.12.1999, Bonn, English Section p. 63-66

Karin Derichs-Kunstmann, Susanne Auszra, Brigitte Müthing: Von der Inszenierung des Geschlechterverhältnisses zur geschlechtsgerechten Didaktik. Konstitution und Reproduktion des Geschlechterverhältnisses in der Erwachsenenbildung. Bielefeld: Kleine Verlag 1999.

Christiane Funken, Kurt Hammerich, Britta Schinzel: Geschlecht, Informatik und Schule. Oder: Wie Ungleichheit der Geschlechter durch Koedukation neu organisiert wird. Sankt Augustin: Academia Verlag 1996.

Gila Hanna (ed.): Towards Gender Equity in Mathematics Education: An ICMI Study. Conference Gender and Mathematics Education of the International Commission on Mathematical Instruction. Höör (Schweden), 1993. Dordrecht [u.a.]: Kluwer 1996.

Koalitionsvereinbarung: Vereinbarung zur Zusammenarbeit in einer Regierungskoalition für die 15. Wahlperiode der Bremischen Bürgerschaft, Juni 1999.

Maria Anna Kreienbaum (ed.): Schule lebendig gestalten: Reflexive Koedukation in Theorie und Praxis. Dokumentation der zweiten landesweiten Tagung des Vereins Frauen und Schule NRW e.V. "Schule lebendig gestalten" in Schwerte, September 1998. Bielefeld: Kleine Verlag 1999.

Albert L. Lederer & Jayesh Prasad: Nine Management Guidelines for Better Cost Estimating. CACM 35, 2, 1992, S. 51 – 59.

C. Dianne Martin & Eric Murchie-Beyma: In Search of Gender Free Paradigms for Computer Science Education. Eugene (Oregon, USA): International Society for Technology in Education 1992.

Renate Meyer-Braun: The International Course of Studies in Computer Science for Women at the Polytechnic University, Bremen (IFI) – Some Comments about the Background and Development of the Planning Processes from the Perspective of the Authorized Women's Representative. Regular Course Offers for Women in a Coeducational Academic Informatics Program. In: Bundesministerium für Bildung und Forschung (Hrsg.): Frauenstudiengänge in Ingenieurwissenschaften und Informatik – Chancen für die Zukunft, Dokumentation der Fachkonferenz vom 14./15.12.1999, Bonn, English Section p. 107-111

Elke Nyssen: "Aber ich behandle doch Mädchen und Jungen gleich" – Über die Notwendigkeit der Frauenforschung in der LehrerInnenausbildung. In: E. Glumpler (Hrsg.): Koedukation. Bad Heilbrunn: Klinkhardt 1994, S. 162-179.

Elke Nyssen: Mädchenförderung in der Schule: Ergebnisse und Erfahrungen aus einem Modellversuch. Unter Mitarb. von Marita Kampshoff. Weinheim [u.a.]: Juventa-Verlag 1996.

Veronika Oechtering: Frauengerechte Hochschulausbildung in technischen Studiengängen. In: G. Winker & V. Oechtering (Hrsg.): Computernetze – Frauenplätze. Frauen in der Informationsgesellschaft. Opladen: Leske+Budrich 1998, S. 115-132.

Veronika Oechtering & Karin Vosseberg: Activation Potential for Women-Oriented College Reforms in Information Technology Study Programs: the *Informatica Feminale* Project. Regular Course Offers for Women in a Coeducational Academic Informatics Program. In: Bundesministerium für Bildung und Forschung (Hrsg.): Frauenstudiengänge in Ingenieurwissenschaften und Informatik – Chancen für die Zukunft, Dokumentation der Fachkonferenz vom 14./15.12.1999, Bonn, English Section p. 75-90

Roger S. Pressman & S. Russell Herron: Software-Schock. Risiko und Chance. München: Hanser 1993.

Britta Schinzel, Karin Kleinn, Andrea Wegerle, Christine Zimmer: Das Studium der Informatik: Studiensituation von Studentinnen und Studenten. Ziel ist die Stärkung des Selbstbewußtseins von Frauen in der Informatik. Informatik-Spektrum, Bd. 22, Heft 1, Februar 1999, S. 13-23.

Inge Schütt & Karl Lewin: Bildungswege von Frauen 1998. Hochschul-Informations-System (HIS) (Hrsg.). Hannover 1998.

Lynn Andrea Stein: Rethinking CS101: Innovations in Introductory Computer Programming. MIT, Cambridge (MA), USA. <http://www.ai.mit.edu/projects/cs101/> (3. Dezember 1999)

Studienführer Informatik. Universität Bremen, Fachbereich Mathematik/Informatik 1998.

Axel Viereck: Planning for an International Women's Course of Studies in Computer Science at the Polytechnic University, Bremen. Regular Course Offers for Women in a Coeducational Academic Informatics Program. In: Bundesministerium für Bildung und Forschung (Hrsg.): Frauenstudiengänge in Ingenieurwissenschaften und Informatik – Chancen für die Zukunft, Dokumentation der Fachkonferenz vom 14./15.12.1999, Bonn, English Section p. 99-106

Birgit Volmerg, Annemarie Creutz, Margarethe Reinhardt, Tanja Eiselen: Ohne Jungs ganz anders? Geschlechterdifferenz und Lehrerrolle am Beispiel eines Schulversuchs. Bielefeld: KleineVerlag 1996.

Deborah Weber-Wulff: PR11: Programmierung I, WS 99/00, General Information Sheet. TFH Berlin. <http://www.tfh-berlin.de/~weberwu/cs101/reports/PROGRAND.HTM> (3. Dezember 1999)

Hiltrud Westram: Schule und das neue Medium Internet – wie gehen die beiden Geschlechter damit um? Dissertation, Universität Dortmund 1999
(<http://eldorado.uni-dortmund.de:8080/FB12/inst3/forschung/1999/westram>)

Published in: Bundesministerium für Bildung und Forschung (Hrsg.):
Frauenstudiengänge in Ingenieurwissenschaften und Informatik – Chancen für die

Zukunft, Dokumentation der Fachkonferenz vom 14./15.12.1999, Bonn, English
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Informatik, in: Bundesministerium für Bildung und Forschung (Hrsg.): Frauenstudiengänge in
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vom 14./15.12.1999, Bonn, German Section p. 93-100