Women in Non-traditional Areas:  
A Report on an Equity Project  
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ABSTRACT  
Student Services Counselling staff were asked to develop support strategies to assist in the retention of women students in non-traditional areas of study at Griffith University. It was envisaged that we would develop and later conduct small group programs. The task proved to be far more complex than anticipated. Preliminary research within Griffith University, as well as the experience of other Australian universities, suggested that separate support strategies for women were neither desirable nor likely to be effective. Instead, it was found that the trend has been towards developing more inclusive strategies for teaching and learning which recognise the diverse background and experience of all students, not only women. The project resulted in a series of recommendations to the University Equity Committee. These included recommendations for staff development and training, and curriculum revision based on models adopted in other Australian Universities and TAFE. The report identified the need for an improved database for participation/retention rates and pointed to possible areas for further research within Griffith University.

BACKGROUND  
Over the past decade efforts have been made to encourage greater numbers of women to study in courses not previously undertaken by women students in any significant numbers. These included courses in the sciences, information technologies and engineering.

A variety of strategies has been undertaken to encourage women to apply for and gain access to such non-traditional courses of study. Griffith University, along with many other tertiary institutions, has been involved in outreach activities to achieve higher rates of female enrolment in non-traditional areas of study in keeping with targets set out in the University’s successive Equity Plans.

Recently concerns have been raised that, although increased numbers of women have been commencing studies within non-traditional areas, in many instances they do not continue within these courses through to graduation. For example, one study of women enrolled in Computer Sciences at the University of Melbourne recorded that from an initial female intake comprising 25% of first year students, the percentage of women students declined to 17% by second year, 15% by third year and by Honours year the enrolment of women had fallen to around 5% (Low 1995; Norling, 1995).

As a consequence there has been a shift away from strategies aimed simply at bringing increased numbers of women into courses of study in non-traditional areas, towards those aimed at improving retention. Hence the focus of the current project was to provide supplementary supports which would encourage the retention of women students. In order to do this however, we had to undertake the following preliminary tasks.

PRELIMINARY TASKS

1. Define the target population by identifying non-traditional courses of study at Griffith University; designate specific courses to which interventions would be aimed.
2. Investigate support strategies already in place within those courses of study and examine their effectiveness.
3. Identify the needs of women students in the designated courses, based on the perceptions of staff and students.
4. Review the experience of other Australian Universities, through a survey of the literature in this area, over recent year, investigate support strategies for women in non-traditional areas in other tertiary institutions and examine their effectiveness. We were also interested to discover the extent of Student Services involvement, if any, in such strategies.
DEFINING THE TARGET POPULATION

Women in non-traditional study as defined and recommended by DEET, are female students enrolled in ‘any category such as field of study or type of course for which the percentage of female enrolments is less than 40%’. This definition has been accepted at Griffith University with the proviso that courses listed as non-traditional continue to be recognised as such until the proportion of women enrolled in a course remains over 45% for three consecutive years. (Griffith University Equity Plan, 1996-1998, p11)

Using figures obtained from Statistics and Planning within the University, it was possible to identify courses in which the percentage of female enrolments is less than 40%, which represent the target population. While a number of courses fell within the DEET and Griffith University Equity definitions of non-traditional, for the purposes of the project we chose to focus our investigations on three courses - B. Environmental Engineering, B. Information Technology and B. Technology Education - as time and resources were limited. Two courses had significant numbers of women students (B. Environmental Engineering and B. Information Technology), which constituted or had the potential for constituting a ‘critical mass’\(^1\). The third course, B. Technology Education, had an extremely small number and proportion of women students. The number and proportion of women students enrolled in these courses is given in the table below.

*Women in Non-Traditional Areas of Study (1995)*\(^2\)

<table>
<thead>
<tr>
<th>Course</th>
<th>Women</th>
<th>All Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Envir Eng</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Info. Tech</td>
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<tr>
<td>B. Tech. Ed</td>
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SUPPORT STRATEGIES/STAFF PERSPECTIVES

A structured interview was developed for use with staff to elicit information about existing support strategies for women and to obtain impressionistic information based on staff perceptions of women’s experiences. The structured interview comprised nine questions based on strategies identified within the NBEET report (1994) relating to retention of women studying in non-traditional courses (as opposed to strategies used to promote access). These strategies include:

- provision of summer schools, residential and other kinds of intensive learning experience to cover technical and other careers related activities
- provision of ongoing support, including social activities and other activities to reduce the isolation of women students
- presentation of workshops on either technical topics, to bridge gaps in female knowledge and skills, or topics to promote personal coping skills

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\(^1\) NBEET (1994) suggests that the development of a critical mass ‘helps to reduce the isolation of women in predominantly male classes by grouping them such that, where women are in a class at all, they will constitute at least 25 per cent of the student group in the class.’

\(^2\) These figures were obtained from Statistics and Planning, Griffith University.
provision of role models and programs using women staff, students from more advanced levels or even women professionals as mentors

development of a critical mass of women by grouping women together wherever possible (preferably comprising at least 25% of the total group) rather than distributing them across classes so that women are isolated from one another

encouragement of a cultural shift to provide equity of learning opportunities for women in non-traditional courses, by undertaking steps such as staff development and curriculum revision to incorporate gender inclusivity.

Contacts were established with faculty staff in the three targeted courses ie Environmental Engineering, Information Technology and Technology Education. Preliminary findings based on these interviews are as follows:

Environmental Engineering

While there are no figures currently available on retention rates for female students enrolled in B. Environmental Engineering at the University, faculty staff interviewed do not believe there is a problem in retaining women students. As yet, there is no separate DEET classification for environmental engineering, hence national comparisons are not available either (Lewis and Harris 1995).

With an enrolment of around 35% women (32.32% in 1995) this course may be seen as having a ‘critical mass’ of women students. Furthermore, given that students in Environmental Engineering attend common classes with other environmental science students (which generally have enrolments of at least 50% women), women enrolled in Environmental Engineering are not always in the minority.

Environmental Engineering was developed within the Faculty of Environmental Sciences which has had a balanced proportion of male and female students since its inception. Hence there has not developed a predominantly male culture, as has occurred within many other engineering courses. Within Environmental Engineering however, there is an imbalance of male and female staff, with the faculty being reportedly keen to recruit more female staff.

Where separate support courses/classes are offered (eg. extra tutorial help with statistics) they are made available to both male and female students. There is an active student group which provides support of various kinds (including relevant career information) and informs the faculty of relevant student concerns.

Information Technology

While B. Information Technology has a significant number of women enrolled at under-graduate level, proportionately women are still under-represented (16.67% in 1995). This figure is even more significant when we consider that the proportion of women enrolled in B. Information Technology has steadily declined in the past 10 years (verbal communication). The declining enrolment of women has been the subject of research conducted within Griffith University involving academics from the School of Computing and Information Technology and the Faculty of Humanities (Greenhill et al. 1997a).

While accurate data on retention are not readily available, staff believe that retention rates for women are better than for men. That is, once women enter Information Technology (IT), they usually complete and prove to be quite capable students. However, there is a significant drop in the rate of women going on to post-graduate study.

Within IT there is a further identifiable subgroup of women whose first language is not English, who are predominantly of Asian background. Hence it is possible that any advantage gained from grouping women students (the ‘critical mass’ concept) may be decreased by cultural differences. The effect of cultural differences between female IT students, on their participation and success in IT education has also been the subject of research within Griffith University (Greenhill, A. et al...
It can be seen from the table below that around 25% of women students enrolled in B. Information Technology are from NESB ie Asian women.

<table>
<thead>
<tr>
<th>Year</th>
<th>NESB Women</th>
<th>All Women</th>
</tr>
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<tbody>
<tr>
<td>1994</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>1995</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>25%</td>
<td>25%</td>
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There are no formal supports or programs offered to women in Information Technology. Mentoring is not and has not been offered, and there are no known specific support groups or networks within Information Technology.

There was some activity in the recent past in promoting Information Technology in high schools. Most staff interviewed felt that it was important to change the ‘image’ of science, in society generally. ‘Boring, men’s work with no people contact’ is an attitude which the staff feel leads to an imbalance in the ratio of men to women’s enrolments. A significant contribution to this issue was a paper written by a Griffith University staff member, Dr Sarah Ashmore where her findings contradicted the popular belief that women do not do science, and in fact showed that women stay in science and often make up the bulk of the grassroots ‘hands on’ scientists (Ashmore 1992).

The most commonly agreed problem was the lack of female teaching staff. It was seen as making it more difficult for female students to approach staff for help, as well as resulting in an absence of models or mentors for students. Staff believe this leads to a feeling of being excluded or not being given recognition. Often staff referred to their own undergraduate experiences in this area. There has been an improvement in the composition of staff selection committees as a direct result of EEO policy, but this has not, as yet, had a flow on effect in terms of recruitment of female staff.

There were no formal plans to review course content in relation to gender bias, although a number of staff interviewed felt that the course was not attractive to women students. Harassment per se was no longer seen as occurring directly and was commonly agreed to be unacceptable behaviour. Some indirect harassment was perceived in offputting, gender language, offensive personal conversations and internet correspondence, but this was seen as mainly restricted to the more immature males rather than the overall culture.

The need not to single women out by specialised support programs was emphasised by this staff group. Women do not want the attention of special help, not even in the form of women’s study groups or networks. It was suggested that any courses/workshops offered should be offered to both men and women. One respondent thought that a skill enhancement course could be a compulsory first year subject for all students.

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1 Statistics and Planning, Griffith University

Journal of the Australia and New Zealand Student Services Association
**Technology Education (EDN)**

There are no separate orientation or ongoing support programs for women students enrolled in the Bachelor of Technology Education. However, with the low number of women enrolled in this course (currently 8 female students in all year levels) this is hardly surprising.

Faculty staff are currently involved in a review of the course, though how much the focus will be on fostering a more gender inclusive curriculum is unclear. A model could be drawn from one developed by Robinson and Mageen on Gender Inclusive Teaching in TAFE (Robinson and Mageen 1992).

Currently, there are no female staff in Technology Education. With only two female graduates in recent years, and very few, if any females employed in school or industry placements, the opportunity for having female role models or mentors is severely limited.

A Women in Technology project was undertaken a few years ago, funded through HEEP, to develop strategies to improve access and retention of women students, however this resulted primarily in the development of an annotated bibliography of resource material.

Understandably, the focus of faculty staff has been on improving access to the course via promotion in schools. There is a current proposal to offer scholarships to women to study Technology Education, sponsored by industry.

Staff were nevertheless concerned to retain female students and were receptive to the development of strategies which may improve this. While the attrition rate for students, both male and female, on this course is around 15%, the attrition rate is higher for females, with most students leaving in the first year (verbal communication). The reasons students leave seem variable and there is currently research being undertaken into this within the faculty.

One problem identified by staff concerns the isolation of Technology Education students within the Faculty of Education. The structure and timetabling of the course is such that Technology Education students have no contact with other Education students, even when they do subjects in common. Technology Education students are further restricted by having limited choices concerning their second teaching areas, compared to other Education students. Both these factors reduce the opportunity for women students in Technology Education coming into contact with other women students or for experiencing classes where women are not in the minority and which may be taught by women, compared to women in Environmental Engineering for instance.

**Identifying women’s support needs**

We were also interested in student perspectives on the experience of studying in non-traditional courses. For example, what kind of difficulties do women students experience, and how supportive are faculties, in their experience? A modified version of the structured interview was developed for use with students, based on the kinds of strategies for promoting retention of female students outlined above, as recommended in the NBEET report (1994). Time constraints prevented students from all areas being interviewed, however the structured interview was pilot tested with a small number of students enrolled in Technology Education. An attempt was made to include graduates and ‘inactive’ students ie those who had withdrawn or taken leave of absence from Technology Education, in the interviews, which met with limited success. Preliminary findings based on these interviews are as follows.

**Technology Education: student perspectives**

The responses of women students were variable, but in general reflected the findings of recent research conducted elsewhere in Australia, based on interviews with women students concerning their experience in non-traditional courses (Lintern 1995, 1996; Lewis 1995; O’Brien 1994; Robinson and Mageen 1992; Copeland 1995).

One woman reported ‘loving’ the course and felt that it was inclusive of women’s and others’ diverse experience. She pointed out that Technology Education students were not an homogenous group, even amongst the males who may have come onto the course straight from school or were mature age students with a trades background. This resulted in gaps in knowledge or experience.
which was not necessarily gender based. This student felt that staff were very supportive and responded to students’ needs as required, regardless of gender. She was strongly opposed to any separate support strategies for women and said that neither she nor her friend on the course would use a mentoring program. They saw no need for women role models either. This student incidentally was strongly opposed to ‘all female’ manual arts classes in high school. She felt they were educationally inferior, and only deferred women’s entrance into a male dominated field, without helping women learn how to ‘fit in’.

A common feeling shared by all women interviewed was that to be successful on the course, women students have to able to tolerate operating in a male culture, which involves acceptance of a certain amount of ‘guy talk’, offensive language, and a level of resentment towards women from some quarters. Comments like ‘You don’t want to ruffle too many feathers because you are stuck with these guys - staff and students - for four years!’ perhaps best convey their sentiments. The perception of women students who had left the course was that they were too easily offended or didn’t make sufficient effort to ‘fit in’.

Two students felt male students, particularly those straight from school, were very immature and generally got better as they progressed through the course. As a corollary, they felt women gained more credibility and respect from male colleagues for ‘sticking it out’. These students felt that a mentoring scheme linking first year women students with later year students might be beneficial, though any scheme would have to be voluntary. These students felt that a major problem confronting women students in this course occurs when they go out on school or industry placements. They complained of receiving no preparation for what to expect and that they frequently encountered resentment and lack of confidence in their abilities compared to male students. Having women as mentors or role models was felt to be one possible way of helping women students feel more prepared for what to expect on placement and how to deal with the situations and attitudes they encountered.

**Review of literature - key findings**

The literature surveyed was predominantly recent ie published within the past five years, and focused on the status of women in science, engineering and technology in Australian tertiary institutions. Some very recent studies have been conducted throughout Australia using the methodology of structured interviews to examine the experience of women students in non-traditional courses. Several have been as yet unpublished theses. There is a remarkable similarity in the findings of these studies concerning the experience of women students and in particular, concerning their attitudes towards strategies designed to assist them. (Lintern 1995, 1996; Lewis 1995; O’Brien 1994; Copeland 1995; Robinson and Mageen 1992.)

Jane Copeland in her article ‘Not Stirring up Trouble’ summarises these findings, as follows:

- masculine environments (ie. science, engineering and technology faculties/courses) discourage and exclude women
- women students are keen to ‘fit into’ the culture, dissociating themselves from feminism, ‘women in engineering’ activities, anything that draws attention to themselves as ‘women’ engineers and not simply ‘engineers’, for example
- it is not that women students are ‘unaware’ or ‘naive’ but that it is in their interest NOT to challenge the status quo
- women students are vocal in opposing separate strategies for women for a variety of reasons - it may appear to give women students an unfair advantage; it implies women students cannot get through without special help; it singles them out and segregates men and women even further; it creates resentment among male students; and generally creates divisions between men and women students (Copeland 1995).

The implication for developing support strategies seems clear. Rather than developing separate support strategies for women in non-traditional areas, the focus needs to be on developing more
inclusive strategies that recognise the diverse background and experience of all students, not only women. So, for example, mentoring schemes should be available to all students, rather than women only.

This trend is reflected elsewhere in the literature. Whereas in the past, women may have been expected to ‘fit into’ the culture of non-traditional courses in science, engineering and technology, the emphasis has shifted to changing the environment to be more inclusive of women and other non-traditional students eg those from NESB, in particular (WISET Advisory Group 1995).

Strategies which have been identified in the literature to achieve this include:

- curricula revision to become not only gender inclusive, but inclusive of other diversity eg NESB, Indigenous Australians, etc.
- staff development to improve staff awareness of gender and other diversity issues in teaching and learning environments
- increasing the number of women staff, especially at higher levels, within science, engineering and technology faculties to provide role models, mentors for women students, but also to influence the culture and curriculum changes. (Byrne, quoted in Copeland (1995), has cautioned that although the use of role models to encourage women has become increasingly popular, there is no evidence that this has been an effective strategy for increasing the enrolment and retention of women in non-traditional courses.)

Recommendations

Having completed these preliminary tasks, we were faced with a much more complex picture of the status of women in non-traditional areas, and the original object of the project, namely to provide support for women students enrolled in these courses, seemed likely to be both undesirable and ineffective. We therefore proposed a number of recommendations, based on our findings through the project, which were forwarded to the University’s Equity Committee. These recommendations may have applicability to other universities interested in improving the quality of learning and teaching for all students, including women studying in non-traditional courses.

The recommendations are consistent with those proposed by the Women in Science, Engineering and Technology (WISET) Advisory Group, established in 1993 to advise on strategies to improve women's participation in science, engineering and technology (SET) careers and education. Several key recommendations were made relating to the need for staff development and training, the development of gender inclusive curricula, the need for a national database for participation/retention rates for women at tertiary level by discipline and sub-discipline, not SET as a whole, and affirmative action to increase the number of women in senior SET education and training at both vocational and academic level. (WISET 1995).

Recommendation 1: Explore models for staff development and training in gender inclusive teaching for implementation within identified non-traditional courses.

Staff development and training in gender inclusive teaching could be offered to staff in non-traditional courses, as defined earlier in this project. This could be undertaken ‘in house’ or through the use of outside consultants, as has been the case at some Australian universities. There are several models available in the literature, but we came across a reference to one developed in Adelaide for TAFE by Pauline Robinson and Pauline Mageen (1992), called ‘Gender Inclusive Teaching in TAFE’ which apparently culminated in the production of a staff development kit which was to be piloted and marketed to the higher education sector.

A review of literature on ‘Gender and Education Processes in the University’, undertaken by Peggy Mares for the Equal Opportunity Board, University of Adelaide in 1991, is a useful resource. Mares comments on the lack of women academics to serve as role models and mentors, and the lack of women in senior positions of influence within faculties; she challenges the idea of gender-linked differences in cognitive styles, arguing that it ignores other influences on women aside from biological ones; and she examines differences in the classroom climate as a result of differences in conversational interaction, male/female attitudes and expectations and sexual harassment.
A recent project, once again undertaken in Adelaide but with a consultant from the National Centre for Women based at Swinburne Institute of Technology, Melbourne deployed a range of strategies to improve the quality of teaching in an engineering course. Group interviews with staff and students to air their views and ideas for changes in tutorials and laboratory sessions, generated valuable feedback which was used in planning educational changes and for training purposes. Video footage of laboratory classes, followed up with individual interviews of students who attended, led to the development of strategies to improve the level and quality of student involvement in laboratory classes. This project 'Valuing Diversity in Engineering Education' (Parfitt, Copeland & Lewis 1995), which we would highly recommend as a model, actually consisted of six separate but integrated projects which involved staff and students in a collaborative venture to review curriculum and the quality of teaching within the faculty. The authors are currently developing a generic staff development model which would be applicable to any non-traditional course.

**Recommendation 2:** Explore models for curriculum revision which cater for all forms of cultural diversity, not only gender, for implementation within identified non-traditional courses.

Curricula revision involves not only an examination of course content to remove gender bias, but should include consideration of teaching methodologies, forms of assessment, and the general climate and culture in the classroom. As this was not the primary focus of this project, we have not reviewed the literature in this area. Given the focus this topic has received at least in schools in the past decade, we feel confident that a body of knowledge exists, although Mares notes that there is little on gender and tertiary teaching whereas there is extensive literature on gender and teaching in schools (Mares, 1991). A reference was found to a document on 'Gender Equity in Curriculum Reform Project' in WISET (1995). One general observation concerning non-traditional courses is that they tend to be characterised by high workloads and high contact hours, and they are very often set courses with limited choices available to students. In short, they are very 'traditional', if not authoritarian, in terms of educational practices and structure.

We would also like to emphasise our previous finding concerning the need for courses in science, engineering and technology to be inclusive of all diversity, not only gender. The project mentioned above 'Valuing Diversity in Engineering Education' also included two projects which focused on meeting the needs of NESB students, and investigating the impact of gender and ethnicity on students' performance, with particular reference to types of assessment. Both projects could usefully be undertaken, particularly in those non-traditional courses which are known to have a high proportion of students from NESB, eg. B. Information Technology.

**Recommendation 3:** Examine EEO targets to ensure priority is given to non-traditional courses, to facilitate the employment of women academic staff, especially at higher levels, within science, engineering and technology courses.

We recognise that Griffith University, like other universities, already has targets for increasing the number of women employed within the University, particularly at senior levels. However, in view of our finding that it is in non-traditional courses, as defined in this project, that the lack of women academics seriously reduces opportunities for women as role models and mentors in courses where women are already in a minority, we suggest that the highest priority should be given to the recruitment of women academics in these courses. The lack of available women graduates in some areas may mean overseas recruitment is necessary. The literature suggests that at least in engineering, participation by Australian women in tertiary courses and in the profession is below the level of participation in the USA and UK (Anderson and Mitchell 1995).

**Recommendation 4:** Develop a database for participation/retention rates for women in non-traditional courses, to allow comparisons between courses, and with other tertiary institutions throughout Australia.

Development of a database for participation/retention rates for women in non-traditional courses, as defined in this project would seem to be a priority if we are to have an accurate picture of patterns of enrolment and attrition amongst women students. At present, as we understand it, this
information is available from Statistics and Planning upon request from faculties or DEET. It is not information which is freely and widely available, partly because of the complexity of the operations involved in calculating participation/retention rates and partly because the value of this information is unclear. Faculty staff recognises that students withdraw from courses for a variety of reasons. These are rarely made known to faculty staff. Some 'inactive' students may simply be on 'leave of absence' and return, while others never return.

The WISET report (1995) recommended the establishment of a national database for participation/retention rates for women in science, engineering and technology by discipline and sub-discipline, data on inter-institutional variations in enrolment, and levels of participation/retention by women researchers by discipline and sub-discipline at all levels of seniority. The inclusion of a separate field of study for environmental engineering, as mentioned previously, together with all these other recommendations would allow the possibility for comparison of Griffith University with other tertiary institutions throughout Australia.

**Recommendation 5:** Develop a protocol for contacting women taking leave, transferring out or withdrawing from non-traditional courses, concerning their reasons for leaving, for use in monitoring participation/retention rates and for feedback which could be used in ongoing curriculum review, staff development etc.

This could be undertaken by faculties via a questionnaire or brief structured interview, which could be incorporated into the leave/transfer/withdrawal application process.

**Recommendation 6:** Further research should be undertaken via structured interviews with staff and students (both male and female), concerning their perceptions and experience of studying in non-traditional courses, targeted in this project. These interviews could be undertaken by the Counsellors involved in this project, faculty staff or outside consultants. Any research of this kind would need to be undertaken with the knowledge and facilitation of faculty staff, until a reasonable sample of staff and students had been interviewed.

The structured interviews with staff and students was found to be a useful research tool for gaining information concerning women students' perceptions about and experience of non-traditional courses. The information gained was fed back to the courses concerned, and this will hopefully be useful to faculties in reviewing their courses and teaching practices. We feel that this research could be extended, to interview a wider sample of staff and students, both male and female. The question of who should conduct this research depends on resource implications. There appears to be some advantage in having an 'outsider' conduct these structured interviews, as staff and students may feel more free to speak openly and honestly about their experiences, without fear of retaliation or some adverse response from staff or the faculty, particularly if they are seen as complaining.

**Conclusion**

If this project has taught us anything, it is that the object of developing support strategies for women in non-traditional courses is far more complex and larger than we had anticipated. Our review of the literature has shown that apart from Careers staff involvement in access programs, and the appointment of Community Development Officers in isolated instances, Student Services staff have not generally been involved in developing support strategies for women in non-traditional courses.

Our broad recommendations indicate the direction we believe Griffith University and any other University should go, faced with concerns over the retention of women students in non-traditional areas. We hope this report may assist others in Student Services in thinking about this problem.

**References**


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