View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Research Repository

Murdoch
UNIVERSITY

MURDOCH RESEARCH REPOSITORY

This is the author's final version of the work, as accepted for publication following peer review but without the publisher's layout or pagination. The definitive version is available at

http://www.asis.org/Conferences/AM01/

Klobas, J.E. and Renzi, S. (2001) Student psychological response to Computer-Supported collaborative learning. In: ASIST Annual Meeting, 2 - 8 November 2001, Marriott Hotel, Washington

http://researchrepository.murdoch.edu.au/23276/

Copyright: © 2001 Association for Information Science and Technology
It is posted here for your personal use. No further distribution is permitted.

33368

Student psychological response to computer-supported collaborative learning

J. KLOBAS, Curtin University of Technology; S. Renzi, Universita' Bocconi

Abstract

The goals of university education include development of life-long learning skills and attitudes that enable graduates to work effectively in modern organizations, including positive attitudes to use of information technology and to collaborative work. Effective graduates feel empowered to resolve problems they encounter in their day-to-day lives as well as at work. Senior undergraduates' cognitive development along these dimensions were studied as they participated in their first course about the Internet.. Students could choose to participate in computer-supported collaborative learning (CSCL) activities. Data were collected in pre-and post-course surveys, and through observation of patterns of participation. Students' self-efficacy for learning and preference for collaborative work increased, while their attitudes to information technology were less favourable. Response to the course varied by extent of participation in CSCL activities, prior preference for collaborative learning and for practice rather than theory in learning.

Introduction

Universities promote life-long learning and the capacity to set goals and reach them autonomously and with others. These capabilities are believed to be crucial in the modern world of work where people are expected to work with rapidly changing computer-based technologies and to continue to learn. The goals of university programs therefore include psychological outcomes as well as learning outcomes. A university education should empower graduates to act independently, to be willing to work in teams, to have a positive attitude to information technology (IT) and change, and to have confidence in their ability to continue to learn.

In their detailed review of research between 1990 and 1999 into the impact of educational technology on learners, Fleming and Raptis (2000) found that, while there has been a rhetoric of technological benefit, there has been little empirical research on the social-psychological effects of technology-supported learning, and the research on impacts of educational technology on students' learning experiences is particularly sparse. Proponents of techniques such as computer-supported collaborative learning (CSCL) expect appropriate use of such techniques to result in positive attitudes toward information technology, and in 'meta-learning' about learning and team work (Aggarwal, 2000; Alexander, 2000; Harasim et al., 1995; Milter & Stinson, 1995). There is evidence that collaborative learning in high school increases individual and group empowerment and changes preferences from teacher-dependent to independent work (Francescato 1997, 1998; Francescato, Tomai, Rosa 1998). The research described in this paper was a preliminary exploration of whether computer-supported collaborative learning at university may have similar effect.

This paper is concerned with psychological responses to an Internet course delivered using computer-supported collaborative learning (CSCL) methods. The responses of interest are those associated with anticipated attitudinal meta-effects of CSCL: capacity for life-long learning, attitudes to information technology, attitudes to collaborative work, and personal empowerment. Given the widely held view that student response to an educational program varies with the fit between learning style and methods of program delivery, students' preferred learning style and patterns of participation in the course were also of interest.

Method

Participants in a one semester introductory Internet course for 3rd and 4th year students at a leading Italian business school were invited to complete questionnaire surveys designed to measure psychological characteristics prior to course commencement and again after the examination.

Data collection and study participants

The pre-course questionnaire was administered to all 132 students who presented themselves in the classroom for the first session of the course, in September 1999. Respondents were told the purpose of the research, including the desire to improve the quality of education at the university. One hundred and thirty useable questionnaires (98.5%) were returned. The responses to these questionnaires were used to check and refine the measurement scales. They also established pre-course measures on each of the variables of interest.

Students completed the course in one of three modes: a) by completing the exam without having to attend lessons (an option available to students of Italian universities), b) by participating in lessons and in group activities supported by Lotus LearningSpace during the first 6 weeks of the course, or c) following their participation in the initial lessons and activities, they could choose to participate, in addition, in an 8 week group project supported by software for computer-supported collaborative work (BSCW). The technologies and their use in the course are described briefly in Table 1.

After the examination period in February 2000, the 104 completing students (9 non-frequenters, 30 participants in class activities only, and 65 participants in all activities) were invited to return a post-course questionnaire. Follow-up phone calls were made to non-respondents two weeks after the initial contact was made. In all, 78 post-course questionnaires were returned, a response rate of 75%. There were 69 valid pairs of pre- and post-course responses. Although the response rate was high, it includes a higher proportion of students who had participated in all course activities than those in the other attendance categories. All post-course scores reported in this paper are therefore biased toward those of the most active participants in the course.

Dependent variables: Measures of psychological impact

The dimensions of interest were: capacity for life-long learning, attitudes to information technology, attitudes to collaborative work, and cognitive empowerment. Rather than attempting to develop new instruments to measure responses along these dimensions, the researchers identified existing instruments, typologies, or guidelines for development of domain-specific instruments which would act as indicators of psychological response along these dimensions. The research was conducted in a course conducted in the Italian language. There are, however, few Italian-language instruments available to measure student response to educational initiatives. It was therefore necessary to translate English-language instruments and to test them in an Italian university environment. The characteristics of all scales are discussed in this section. A list of items in English and Italian is available from the authors. The survey form is available (in Italian only) from the authors.

· Capacity for life-long learning

Capacity for life-long learning is likely to reflect a person's confidence in their ability to learn effectively (Bandura, 1997). Capacity for life-long learning was therefore represented in this study by self-efficacy for learning. The measurement scale was developed from the academic self-efficacy scale developed by Wood & Locke (1987) using examples and guidelines provided by Bandura (1997; undated). The scale included in-classroom activities drawn from Wood & Locke: memorisation, class concentration, understanding, explaining concepts, and note taking, and additional activities expected of senior students: ability to organize work to meet course deadlines, ability to understand concepts covered in lessons, ability to summarize these concepts, ability to explain them to other students, ability to recall key concepts after a course of study has been completed, and ability to independently locate information resources needed for study. All of these concepts have some parallel in learning outside university: the need to organise work, to understand key concepts, to summarise them, to explain them to others, and to recall them some time after they have been encountered, and to independently locate the resources needed to learn. A typical item was "I am able to organize my activities so that I can meet most course requirements.". All items were measured on an 11 point scale ranging from 0: "I am definitely not able to do this" to 10: "I definitely can do it". Responses to ten discriminating items formed a scale with good internal reliability both pre- and post-course (Cronbach alpha at time 1 (t1)=.9161; at t2=.8942).

· Attitudes to information technology

Attitude to information technology was measured in two domains. Firstly, in relation to 'the world in general', in the form of an established instrument to measure computer anxiety (Harrison & Rainer, 1992; Heinssen, Glass & Knight, 1987), and secondly in relation to the specific technology used in the course (Klobas & Clyde, 1998; Klobas & Morrison, 1999).. While the first form more directly represents attitudes to information technology in the world of work, it is non-specific and unlikely to detect changes in attitude during a period as short as one semester. The second form is specific to the domain in which the technology is to be used; in this case, it referred to use of Lotus LearningSpace to support activities. This form has the advantage that changes in attitudes to a specific technology can be detected within a specific time frame, but the disadvantage that we do not know if these changes affect attitudes to information technology in general. Correlation between the two scores would suggest that such a relationship exists.

The computer anxiety scale was translated directly into Italian from the form in which it was tested by Harrison & Rainer (1992). Responses were measured on a 5 point scale ranging from 1: "disagree completely" to 5: "agree completely". Internal consistency was adequate, but not strong, for the full 12 item scale in both pre- and post-course administration (alpha at t1=.7017, n=127; at t2=.7581, n=71). The relatively low inter-correlation among items may reflect the ambiguity of the generic attitudes to computing represented by the scale. In addition, this scale may not be as well adapted to use by Italian students in a modern business university as it was in its original US domain.

A more specific scale was used to measure attitudes to Lotus LearningSpace, the primary learning technology used in the course. These measures of attitudes to information resource use (ARTU) are sub-scales of the information systems use estimation (ISUE) scales introduced by Klobas & Clyde (1998). Two types of attitude to information resource and technology use (ARTU) were measured: attitudes to outcomes of use (ARTU-O, 7 items, pre-course alpha=.8875, post-course=.9233) and perceived control of use (ARTU-C, 6 items, alpha at t1=.7337, at t2=.6455). A typical ARTU-O item was " Using this technology will be helpful in this course ". A typical ARTU-C item was " The technology will be available every time I want to use it.". All items were measured on the same 5 point scale as the computer anxiety instrument.

· Attitudes to collaborative work

Attitudes to collaborative work were measured in the specific domain of collaborative work in which the students participated: their work as university students. Four items were derived from the Grasha-Reichmann descriptions of the collaborative learning style. Typical items were "I like to work with other students" and "Group work is a waste of time". They were measured on a 4-point scale with values of 0: Never; 1: Rarely; 2: Sometimes; 3: Often. Cronbach alpha was satisfactory (.7254 at t1 and.8100 at t2). Responses to the 4 items were summed to give an attitude to collaborative work rating on a scale of 0-12.

· Cognitive empowerment

Cognitive empowerment refers to an individual's sense of mastery of, or coping with, the world in which they live. This study used Schwarzer's 10-item "general self-efficacy" scale as an indicator of empowerment (Schwarzer et. al, 1997). The scale is described here as a measure of general coping skills, a term drawn from Schwarzer's description of general self-efficacy as "optimistic self-beliefs to cope with a variety of difficult demands in life" (http://userpage.fu-berlin.de/~health/selfscal.htm). A typical item is "If I am in trouble, I can usually think of something to do". The scale was available Italian. In pre-course administration, all items were measured on the same 5 point scale as attitudes to information technology. This scale produced significant bunching of scores around the mid-point. In post-course administration, the items were measured using the same 11 point scale as self-efficacy for learning. These responses were approximately normally distributed. The scales were internally consistent in both pre- and post-course administration (alpha at t1=.8593, n=129; alpha at t2=.8424, n=66). Pre- and post-course scores were standardized (converted to z-scores) to permit comparison. Nonetheless, because general coping skills are considered less malleable than the other response variables considered in this study, the authors did not expect to observe any change during the short period of a single course.

Independent Variables

· Learning style

No suitable learning style scale for administration in an Italian university classroom was identified. Items were instead generated Hruska and Grasha's (1975) descriptions of the Grasha-Reichmann student learning styles (GRLSS), and Furnham's (1996) description of the dimensions in the Honey and Mumford (1982) learning style questionnaire (LSQ). The 24 items derived from these sources were measured on a four-point scale: often, sometimes, and seldom, never. Nine items were subsequently eliminated because of low variance. When scores (measured in the pre-course survey) on the remaining 13 items were submitted to cluster analysis, the students formed the five groups described in Table 2.

· Participation in collaborative learning activities

Participation was measured on five dimensions: whether a student had participated in class activities, the number of messages each student had posted to the Lotus LearningSpace discussion areas (class and group), the number of reflective weekly diaries submitted by each individual, the number of weekly group assignments submitted, and whether or not the student had participated in the final group project. Data on each of these dimensions were available from course and system administrators at the end of the course. The students who participated in class activities were classified, using hierarchical cluster analysis (Ward's method with Euclidian distances) into the four groups described in Table 3.

Although actual participation was consistent with learning style preference, there was not a direct correspondence between the two. For example, while 40% of the collaborative learners participated in a style classified as "collaborative", 18.9% were highly active throughout the course, 33.3% were more pragmatic.

Results and Discussion

Observations across the whole group are reported first followed by observations of difference by learning style preference or participation pattern. Because some groups had low sample sizes, the observations of difference are based primarily on graphical observation (box plots).

· Self-efficacy for learning (SEL)

SEL increased between the beginning and end of the course. Mean pre-course SEL was quite high: 69.11 (out of a possible 100), with only modest variation (standard error=1.32). Despite high pre-course SEL, post-course SEL was significantly higher (mean=77.29, se=1.30, t=3.12, df=65, $p < .01$). Pragmatists and theorists had the lowest beginning SEL, but along with collaborative learners, the highest increases. Students who participated in all course activities, including the project (highly active and collaborative participants) had a greater increase in SEL than less active participants.

· Attitudes to use of information technology

The participants displayed little anxiety toward use of computers in general computer anxiety, CA). Mean CA for participants who completed the scale prior to course commencement was 2.14 (se=.05, n=127), below the mid-point of the 5 point scale. There was no significant change in CA by the end of the course (mean=1.97, se=.06, n=71). Nonetheless, pragmatists and theorists had the highest CA, and highly active participants had the lowest CA, before course commencement. There were no difference in CA by the end of the course, suggesting that participation in CSCL did make a difference.

Prior to course commencement, the students had positive attitudes to use of the specific technology proposed for the course. They expected using LearningSpace (LS) in the course to have strong, positive outcomes (ARTU-O mean=3.96, se=.06, n=130). After completing the course, their attitude to the outcomes of using LearningSpace in similar courses remained positive, but significantly less so (mean=3.55, se=.11, n=74, t=-4.13, $p < .001$). There was little expectation of difficulty using LS for the course (ARTU-C pre-course mean=3.59, se=.06, n=129; post-course mean=3.24, se=.09, n=75). Post-course perceptions of control, although still above the mid-point of the scale were significantly lower (mean difference=-.42, se=.11, t=3.81, $p < .001$, n=68). The decreases primarily reflect a change among collaborative learners, who began the course with very high expectations (ARTU-O=4.55, se=.15 ARTU-C=4.17, .17). Several of these students (although by no means all) were disappointed with the course technology, reducing the post-course mean scores for that group significantly (to 3.01, .24 and 3.18, .22 respectively). The decreases may also have reflected teething problems with implementing the LS technology during the first month of this, its first use at the university. Students who were highly active throughout the course had more positive attitudes to the course technology, both prior to, and at the end of, the course, confirming that high active participation is associated with high expectations of positive outcomes from using the technology and a sense of mastery over it (Klobas & Clyde, 2000; Klobas & Morrison, 1999).

Computer anxiety was correlated with both attitudes to outcomes of use (ARTU-O, r=-.37, n=130, $p < .001$) and perceived control of use (ARTU-C, r=-.58, n=130, $p < .001$), indicating that domain-specific measures of attitudes to use of information technology may be effective substitutes for general measures of attitudes to use of information technology in general.

· Attitudes to collaborative work

Attitudes to collaborative work were more positive after completion of the course (t=2.68, df=61, $p < .01$). Prior to course commencement, the mean score was 7.88 (se=.21, n=129), while after course completion the mean score was 8.45 (se=.30, n=71). The increase in mean score was accompanied by greater variation in attitudes to collaborative work; while some students became much more interested in working collaboratively, others changed their attitudes to collaborative work only a little. The increases were consistent for all learning styles and all modes of participation.

· Cognitive empowerment

There was no observable increases or differences in empowerment, as measured by the general coping skills scale, over the period of the course. A longer period of observation, a more sensitive instrument, or a more specific form of intervention, is required to increase empowerment.

Discussion

After completion of a one semester course which used computer-supported collaborative learning, senior undergraduate university students had higher self-efficacy for learning and a stronger preference for collaborative work. CSCL increases confidence in ability to learn and willingness to undertake collaborative work, regardless of prior preferences or extent of participation in a course. Participation in CSCL also appears to reduce anxiety about working with computers; pragmatists and theorists, who showed least prior interest in collaborative work, began the course with both lower self-efficacy and higher computer anxiety than other students, but ended the course at the same level as the others. This suggests that CSCL improves outcomes, not only for students with a prior preference for collaborative learning, but also for those with relatively little prior interest in this mode of learning. Those students who participated most actively in the course, and in particular in the optional CSCL project, had a greater increase in self-efficacy than the others, suggesting that participation in an experiential project supported by collaborative working software (BSCW, in this case) increases self-efficacy for learning even more than participation in more classroom-based CSCL activities alone. In essence, CSCL has positive outcomes for all types of learners, and experiential CSCL projects enhance these benefits.

Other psychological responses, such as empowerment (general coping skills), may develop over a longer period of time than one semester. Research over a longer period of university study is needed to identify changes in these more enduring characteristics.

Although not directly relevant to the research reported here, it is worth noting that students responded positively to the course. Student self-reported knowledge of course content increased markedly. The mean difference for 63 pre- and post-course respondents was 41.75 on a scale of 0-100 (se=3.25, t=12.85, df=62, $p < .001$). Neither the extent of post-course knowledge, nor the increase varied by learning style preference or mode of participation, that is, the course was effective for all groups of students regardless of learning style or mode of participation. Student evaluations of the course were high, although box-plots suggest that theorists and pragmatists may have enjoyed the course a little less than the others. The theorists (n=5) rated the collaborative activities and the course technology lower than other students, while the pragmatists rated the activities and technology highly. The theorists' lower enjoyment of the course did not, however, reflect either less perceived learning or less positive psychological outcomes.

Conclusion

This study has demonstrated the potential for research into the psychological effects of computer-supported learning at university. It is possible to measure the effects of computer-supported learning on psychological factors associated with the 'meta-goals' of attendance at university, including capacity for life-long learning and attitudes to computer-based technologies and to working collaboratively. It may also be possible to identify other effects, such as an effect on empowerment or general coping skills. Directions for future research include: use of interviews and other qualitative data collection methods to better explain the effects identified here, examination of whether different learning technologies and modes of delivery have differential psychological effects, and identification of differences in learner characteristics associated with differences in psychological impact of learning technologies.

References

Aggarwal A. (Ed.). (2000). Web-Based Learning & Teaching Technologies: Opportunities and Challenges. Hershey, PA: Idea Group Publishing.

Alexander, J. O. (1999). Collaborative design, constructivist learning, information technology immersion, & electronic communities: A case study. Interpersonal Computing and Technology, 7(1-2), www.emoderators.com/ipct-j/1999/n1-2/alexander.html.

Bandura, A. (1997). Self-efficacy: The Exercise of Control. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (undated). Guide for constructing self-efficacy scales. Unpublished notes.

Beynon A. L. (1985) Attitude to professionalism as mediated through a computer aided learning program: An exploratory study. Research in Education, 33,1-11.

Fleming, T., & Raptis, H. (2000). A topographical analysis of research, 1990-99. Teacher Librarian, 27(5), 9-14.

Francescato, D. (1997) An empowerment training model to favour transition from school to work for senior high school students. Proceedings of the 7th European Conference on the Promotion of Mental Health, Maastricht 8-10 October 1997, 63-64.

Francescato, D. (1998) Come promuovere una cultura imprenditoriale. NEXT, 1, 125-131.

Francescato, D., Tomai, M. & Rosa, V. (1998) Crea il lavoro che desideri: un progetto di intervento per motivare al lavoro in proprio. (pp. 251-288) In P. Serreri (a cura di) Programma Feronia. Liberi di sapere, Franco Angeli, Milano.

Gagne, R. M. (Ed.), Learning and Individual Differences. Columbus, OH: Charles & Merrill.

Garito M.A. (1996). Multimedialità nell'insegnamento a distanza. Garamond, Roma.

Harasim, L., Hiltz, S. R., Teles, L., & Turoff, M. (1995). Learning Networks: A Field Guide to Teaching and Learning Online. Cambridge, MA: MIT Press.

Harrison, A. W., & Rainer, R. K. (1992). An examination of the factor structures and concurrent validities for the Computer Attitude Scale, the Computer Anxiety Rating Scale, and the Computer Self-Efficacy Scale. Educational & Psychological Research Measurement, 52(3), 735-745.

Hazemi, R., Hailes, S., & Wilbur, S. (1998). The Digital University: Reinventing the Academy. Berlin: Springer-Verlag.
Heinssen, R. K., Glass, C. R., & Knight, L. A. (1987). Assessing computer anxiety: Development and validation of the Computer Anxiety Rating Scale. Computers and Human Behavior, 3(1), 49-59.
Loyd, B. H., & Loyd, D. E. (1985). The reliability and validity of an instrument for the assessment of attitudes. Educational & Psychological Measurement, 45, 903-908.
Honey, P. & Mumford, A. (1982, 1986, 1992). Manual of Learning Styles. London, Maidenhead: P. Honey.
Hruska, S. & Grasha, A. F. in W. H. Bergquist & S. R. Philips, A Handbook for Faculty Development, Washington, D.C.: The Council for the Advancement of Small Colleges, 1975. Extract at http://www.fln.vcu.edu/Intensive/LearningStyles.html
Jensen, G. H. (1987). Learning styles. In J. A. Provost & S. Anchors (Eds.), Applications of the Myers-Briggs Type Indicator in higher education (pp. 181-208). Palo Alto, Ca.: Consulting Psychologists Press.
Klobas, J. E., & Clyde, L. A. (1998). Learning to use the Internet in a developing country: Validation of a user model. Libri, 48(3), 163-175.
Klobas, J. E., & Clyde, L. A. (2000). Adults learning to use the Internet: A longitudinal study of attitudes and other factors associated with intended Internet use. Library and Information Science Research, 22(1), 1-30.
Klobas, J. E, & Morrison, D. (1999). A planned behavior in context model of networked information resource use. In H. Bullinger & J. Ziegler (Eds) Human-Computer Interaction: Communication, Cooperation, and Application Design (pp. 823-827). Mahwah, New Jersey: Lawrence Erlbaum Associates.
Luk-Suet-Ching, W. (1998) The influence of a distance-learning environment on students' field dependence/independence. Journal of Experimental Education, 66(2), 149-160.
Milter, R. G., & Stinson, J. E. (1995). Educating leaders for the new competitive environment. In W. H. Gijselaers, D. T. Tempelaar, P. K. Keizer, J. M. Blommaert, E. M. Bernard, & H. Kasper (Eds.), Educational Innovation in Economics and Business Administration: The Case of Problem-Based Learning (pp. 30-38). London: Kluwer Academic.
Owens, L. & Straton, R.G. (1980) The development of a cooperative, competitive, and individualized learning preference scale for students. British Journal of Educational Psychology, 50, 147-161.
Palloff, R. M., & Pratt, K. (1999). Building Learning Communities in cyberspace: Effective Strategies for the Online Classroom. San Francisco: Jossey-Bass.
Schimmenti, V., D'Alessio, M. & Schieda, A. M. (1996). Il computer: Rappresentazione & apprendimento in età scolare. Franco Angeli, Milano.
Schwarzer, R., Bäßler, J., Kwiatek, P., Schröder, K., & Zhang, J. X. (1997). The assessment of optimistic self-beliefs: Comparison of the German, Spanish, and Chinese versions of the General Self-Efficacy Scale. Applied Psychology: An International Review, 46(1), 69-88.
Sherry, L. & Morse, R.A. (1995) An assessment of training needs in the use of distance education for instruction. International Journal of Telecommunications, 1(1), 5-22.
Wilson, T. & Whitelock, D. (1998). Monitoring the on-line behaviour of distance learning students. Journal of Computer Assisted Learning, 14(2), 91-99.
Wood, R. E., & Locke, E. A. (1987). The relation of self-efficacy and grade goals to academic performance. Educational and psychological measurement, 47, 1013-1024.

Table 1: CSCL technologies used in the course

	Description	**Uses**
Lotus LearningSpace	Browser-accessible e-learning platform based on four containers: Schedule (course activities), MediaCenter (educational material), CourseRoom (course discussions and assignment submissions) and Profiles (teacher and student profiles, student grades, setup	Publishing all course materials and messages from teachers; submission of group and individual assignments; discussion area for student groups
BSCW (Basic Support for Collaborative Work)	Web-based collaboration software. Users can share a workspace to store files (documents, multimedia files, etc.) and URLs organized within folders. Typical group activities include threaded discussions, meeting facilities and event notification	Document repository and discussion database for group projects

Table 2: Learning style groups

	Description	**No. (%) of students**
Active learners (AL)	Interested in all forms of participation and practical course work	23 (18.9)
Collaborative learners (CL)	Strong preference for collaboration and participation, and a balance between theory and practice	56 (45.9)
All-round learners (RL)	Some interest in collaboration and participation; preference for a balance between theory and practice	22 (18.0)
Pragmatists (PL)	More interested in practice than theory, but with little interest in participating in course activities	14 (11.5)
Theorists (TL)	Preference for theory over practice ; very little interest in participative activities	7 (5.7)
Total		122

Table 3: Actual participation

	Description	**No. (%) of students**
Highly active (AP)	Participated very actively in all activities, including the project, and submitted more than 10 messages to the LearningSpace discussion area	12 (11.5)
Collaborators (CP)	Completed the project and participated in all activities, but posted less than 10 messages to the discussion area	53 (51.0)
Pragmatic (PP)	Selectively participated in class activities; did not participate in the project	28 (26.9)
Non-participator (NP)	Did not participate in class activities	11 (10.9)
Total		104