

12.3_Intro Report A

Survey of perceptions of benefits of computing developments by age group

Introduction

There has been much debate about the extent to which older people are excluded from the benefits of developments in computing technology. In order that all age groups can benefit equally from these improvements, it is important that older people feel positive about new developments and how they can benefit from them. This report will describe a survey undertaken to examine the differences in use of new computer technologies and perceptions of future developments, between younger and older adults. Recommendations will be made on how the perceptions of older people can be improved.

Method

A written questionnaire was designed to measure how younger and older adults differ in their attitudes to new developments in computing. Six hundred questionnaires were sent to a random sample selected from each of the two subject groups, of which 250 were returned. In addition, 25 young people were interviewed in universities and libraries. Over 65% of the sample were male.

Findings

Firstly, a minority (20%) of older respondents stated that they felt that future technological developments would not be generally beneficial. In addition, the majority (70%) said they felt the developments would be generally beneficial and a small proportion (10%) had no opinion. The results from the sample of younger people were similar. Finally, a significant majority (75%) indicated that future technological developments would be generally beneficial, while a minority (25%) of younger respondents felt the developments could be more harmful than beneficial.

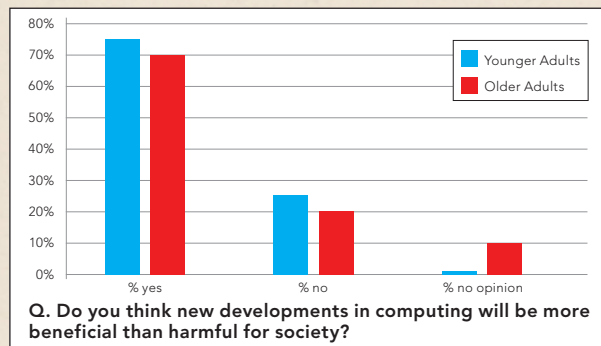


Figure 1: Perception of benefits of new developments in computing to society generally

The question of whether new developments in computing would benefit their particular age group showed a very interesting difference between the two groups. Firstly, an overwhelming majority of younger adult respondents (88%) said they agreed with the statement, whereas a smaller majority of older adult respondents (58%) agreed. Moreover, a significant minority of older adult respondents (28%) disagreed with the statement, along with 8% of younger adult respondents. A small number of both older and younger adults had no opinion.

Discussion

It is clear from this research that there are similarities in the perceptions of younger and older adults regarding future technological developments. A majority in both groups felt that future technological developments would be generally beneficial. However, there are also some differences. The most significant was whether respondents believed new developments in computing would benefit their age group. The majority of younger respondents (88%) felt that new developments would benefit their age group, whereas only 58% of older respondents felt their age group would benefit. The return rate was quite high, at just over 40%, which can give us reasonable confidence in the validity of our results.

Conclusion

In conclusion, it is clear that both younger and older adults feel that future technological developments will be generally beneficial. However, older adults were less sure that the new developments would benefit their age group. It is important that the reasons for this perception are investigated further.

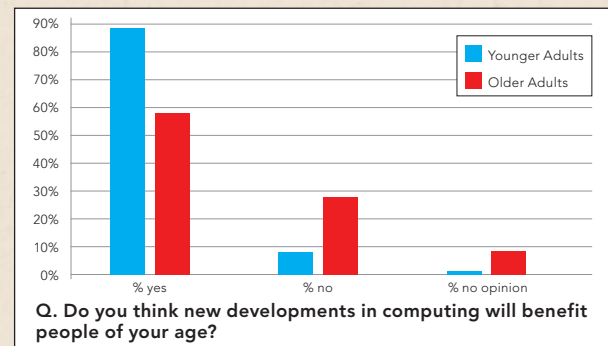


Figure 2: Perception of benefits of new developments in computing to specific age group

12.3_Intro

Report B

Literature search on increases in computing power

Introduction

From the mid-1960s onwards, the processing power of computer chips has continued to increase exponentially. This has meant that each year, faster and more efficient computer systems can be developed. In recent years, the rate of the increase in the processing power of chips has begun to slow. This affects the processing power which can be made available for a wide range of different types of computer systems. This report describes a literature search which provides a summary of the issues in this area; suggestions will be made for addressing these issues in practice.

Method

The exponential growth curve in the processing power of systems is key to continued new developments in computing. In order to find out what the main issues and ideas are relating to the continuation of this growth, a literature search was undertaken using the ScienceDirect database and Google Scholar. The search terms which were used were *growth curve*, *computing* and *processing*.

Findings

The literature search found that the miniaturization of components to fit on silicon chips is reaching its limit. It also found that there are a number of possible options for maintaining the increase in processing power for computer systems. The first option is creating a 'system on a chip' using silicon. This offers some possibilities for growth, but these are limited. Another option is the development of general purpose or specialized AI processors. It is likely that specialized AI processors would be more efficient. However, as both types of processors use silicon, physical limitations would still apply. The use of alternative materials to create processors is another possibility to maintain the increase in processing power. One example of these materials is graphene. A longer-term possibility is the development of more effective quantum computing, which offers huge possibilities for increased processing power.

Discussion

The research has shown that the number of components which can be created on a silicon chip is now very close to the maximum limit. It is possible to design chips which are more efficient by creating a 'system on a chip'. However, these can only increase efficiency by a relatively small amount. The efficiency of systems doing AI processing have been increased by using general purpose AI silicon chips. This efficiency could be further increased by creating processors which are specialized for specific AI applications, such as speech recognition. The development of these types of chips has a lot of possibilities, but their use of silicon will still limit their efficiency. Other materials could be used instead of pure silicon. Graphene is much less physically limited than silicon and, as a result, is potentially an important area for development. The final possibility to consider is quantum computing. Working versions of quantum computers are already available, but this development is likely to happen over the long term. However, it has enormous potential and could completely change the computing industry.

Conclusion

To conclude, it appears that while the processing power of classical computer systems is increasing, the rate of increase is likely to slow over time. The evidence from the literature suggests further research should be carried out into areas where new developments are possible, such as new materials for processors where physical limitations are less likely to have an impact. Consideration should also be given to exploring the practical implications of ongoing developments in quantum computing. This research should help system designers to continue to design next generation computing systems.