

ISC13D032

Title: *Student printing and photocopying*
Author: Jonathan Colam-French and Mark Jones
Date: 27 January 2014
Circulation: ISSC
Agenda: ISC13A003
Version: Final
Status: Open

Issue

The student printing and photocopying services currently run as two discrete services, with different charging models. As technology has changed it now makes sense to converge these to a single service using multi-function printing and photocopying devices (MFDs). However converging the services will require an alignment of the charging models and this may have an impact on student satisfaction.

Recommendation

Recipients are asked to consider

- Recommendation 1 - Deliver ISD student network printing service utilising MFD technology. (page 11)
- Recommendation 2 - Change to the cost of printing and photocopying (two options).
 - Option 1 – Align printing and photocopying charges to the lower level fee of 3 pence per side. (page 11)
 - Option 2 – Increase printing and photocopying charges but introduce a level of free printing for all students. (page 12)
- Recommendation 3 - Faculty provision of student network printing services should be integrated into the centrally provided solution. (page 12)

Resource Implications

	2014/15	2015/16	2016/17	2017/18
2.3 - Changes to student printing and photocopying (recommendation 1) - initial move to MFDs and consolidation of service, printing and photocopy fee unchanged.	43,000	12,000	12,000	12,000
2.3 - Changes to student printing and photocopying (recommendation 2 option 1) - initial move to MFDs and consolidation of service and reduction of photocopying charge to 3 pence.	73,000	42,000	42,000	42,000

	2014/15	2015/16	2016/17	2017/18
2.3 - Changes to student printing and photocopying (recommendation 2 option 2) - initial move to MFDs and consolidation of service, printing and photocopy fee set at 5 pence per side and all students provided £10 free printing per annum.	88,500	53,000	53,000	53,000

Risk Implications

The current printing and photocopying infrastructure is coming to end of life and will need to be replaced. The recent ISD Survey indicates a level of dissatisfaction among students with printing and it is anticipated that a move to MFD's and a converged service will go some way to addressing these concerns.

It will be untenable to charge different fees for photocopying and printing when they are delivered from the same device. Any reduction in printing or photocopying fees will impact ISD budgets; any increase in the charge will impact student experience. This paper explores different charging models that could be adopted to reduce this risk.

Equality and Diversity

Information Services aims to make all our services and facilities accessible to all. Any changes to service provision or policy are subject to Equality Impact Assessments when they are implemented

Timing of decisions

The recommendations of ISSC will be reported to ET-R and help inform their decision on additional budget allocation.

Further Information

Jonathan Colam-French, j.colam@uea.ac.uk, phone 3858.

Discussion

Title: **Student network printing service review**

Author: Mark Jones

Date: **7th January 2014**



Introduction

ISD delivers a student network printing service enabling students to print, scan and photocopy documents securely within the Library. Additional ISD printing facilities are available in the ITCS and ARTS1 buildings. Feedback from students and survey results shows demand for printing, scanning and photocopying to be made available in each of these ISD managed spaces, a consistent approach to the provision of credit arrangements and the opportunity to print in duplex mode to reduce the environmental impact of this service.

Current hardware does not allow ISD to meet these demands. This review considers changes to provide a more consistent and reliable service, enable wider access to additional functionality to improve the student experience, provide an option for duplex printing and select hardware that is compatible with recycled paper. Faculty and school printing arrangements are explored alongside an analysis of charging and credit arrangements.

Drivers for change

Analysis of the 2013/14 ISD Survey shows that 339 comments directly related to student network printing were made.

- 163 highlighted that that additional printing facilities were required in more locations and that the existing provision was unreliable.
- 104 comments stated that the cost of printing was high and that it should be free or cheaper, and that there is inequality in the existing system with some schools offering print credit on differing print management software systems.
- 24 comments stated that duplex printing should be incentivised in the pricing model and encourage for sustainability reasons.
- 43 requested additional functionality to be able to print from any mobile device.

Between the start of September 2013 and the end of December 2013 there were 332 calls logged related to student network printing indicating disruption to students and additional IT Support costs.

Changes to the student network printing service need to deliver improvements to the student experience and greater sustainability by achieving the following;

- Improved reliability of the service resulting in greater up-time.
- The service should be available in all appropriate locations.

- All students should experience the same service across campus utilising the same software and be able to access credit in all locations.
- Print credits arrangements should be fair, consistent and transparent across the whole student body.
- Duplex printing should be enabled to deliver greater sustainability of the service.
- Students should be able to print from any mobile device in any format.

Current provision of ISD student network printing

The current ISD student network printing fleet is a mix of laser printers, photocopiers and flat-bed scanners located in the ITCS, Library and ARTS1 buildings.

Building	Floor/Room	Number of A4 B/W printers	Number of A4 Colour printers	Number of A3 Colour printers	Number of Photocopiers	Number of Scanners	Number of Cash Acceptor Machines	Number of student workstations
Library	02	1			1			8
	01				3		1	25
	0	10	1	1	7	3	2	100
	1	3	2		1			54
	2							25
	3							24
Arts	1.02	2					1	66
	1.05	2	1					69
ITCS	1.02	1	1					25
	1.26	1						83
	0.17	1						61

Printing and photocopying are managed via PaperCut print management software which allows students to manage their account, add credit and securely print or photocopy documents against set charges. Students send print jobs to a print queue from a student workstation, or from their own device via a web interface if they wish to print PDF and Word files, and are then able to release the job by logging into a print release workstation attached to each printer. PaperCut manages the release of the documents for print and the respective charging.

Photocopying and scanning are only available within the Library. Photocopying is charged with students authorising payment via their campus card. No charges are applied to scanning.

Four virtual cash acceptor machines are available for students to add credit to their accounts in two of the three buildings ISD operates this service.

Limitations of the existing provision:

- Photocopying and scanning facilities are only available on specific floors in the Library. None of these facilities are available for students in ITCS or ARTS1.
- A3 colour printing is only available on Floor 0 of the Library. Some floors within the Library have no facilities for printing.
- Duplex printing can't be enabled as a default option within the current hardware environment as this consists of mainly mono-only capable devices.
- Laser printers are less efficient devices for printing high volumes of paper and are more prone to faults.
- Students are only able to add credit in two of the three locations this service operates in.

Demand for ISD printing and photocopying

Printing and photocopying reports are available from 2011 onwards. Usage data indicates that demand for printing in ISD managed locations has grown since 2011 by 3.8% whilst photocopying demand fell by 13.5%. Photocopying now representing 7.1% of total demand.

The move to online coursework submission has not reduced the demand for printing in these locations. 66% of all assignments in 2012/13 were submitted online with the remainder of assignments being delivered by alternative submission arrangements. A true understanding of what is printed and of photocopying habits is not known but demand has remained relatively consistent despite the introduction of online submission. Usage correlates closely to the coursework submission cycle inferring demand is largely driven by academic requirements.

UEA Financial year	Number of sides printed	Number of sides photocopied
2011-12	3,073,660	255,690
2012-13	3,184,884	221,269

Current printing, photocopying and scanning charges

UEA's charging model has been presented alongside the twenty-four Russell Group universities which has been used as a sample group to provide comparison.

*Price for two sides

	A4 printing charges	A3 printing charges
--	----------------------------	----------------------------

Institution	Mono	Mono Duplex*	Colour	Colour Duplex*	Mono	Mono Duplex*	Colour	Colour Duplex*
UEA	3p	6p	30p	60p	3p	6p	100p	200p
University of Birmingham	4p	4p	20p	20p	8p	4p	40p	40p
University of Bristol	5p	10p	20p	20p	N/A	N/A	N/A	N/A
University of Cambridge	5p	10p	30p	60p	10p	20p	60p	120p
Cardiff University	6p	10p	20p	32p	N/A	N/A	40p	64p
Durham University	4p	7p	20p	35p	8p	14p	40p	70p
University of Edinburgh	5p	8p	30p	48p	15p	24p	60p	96p
University of Exeter	6p	10p	13p	26p	9p	8p	21p	40p
University of Glasgow	5p	7p	15p	27p	N/A	N/A	N/A	N/A
Imperial College London	3p	6p	12p	24p	6p	12p	24p	48p
Kings College London	5p	10p	20p	40p	10p	20p	105p	210p
University of Leeds	4.5p	7.5p	9p	16.5p	6p	10p	16p	22p
University of Liverpool	5p	8p	10p	16p	7p	11p	15p	24p
LSE	4p	8p	30p	60p	30p	60p	30p	60p
University of Manchester	5p	8p	21p	40p	10p	16p	42p	80p
University of Newcastle	4p	8p	N/A	N/A	N/A	N/A	N/A	N/A
University of Nottingham	6p	10p	25p	40p	12p	20p	50p	80p
Oxford University	6p	9p	38p	57p	10p	15p	76p	114p
Queen Mary University	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Queens University Belfast	5p	10p	20p	40p	5p	10p	20p	40p
Sheffield University	5p	10p	25p	50p	10p	20p	50p	100p
University of Southampton	5p	10p	25p	50p	10p	20p	50p	100p
UCL	5p	10p	25p	45p	15p	20p	50p	90p
University of Warwick	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
University of York	5p	9p	15p	29p	10p	18p	30p	58p

UEA currently ranks within the lowest 6% of these universities for A4 and A3 mono costs but also in the top 20% of universities for A4 and A3 colour costs compared to this group.

	A4 printing charges	A3 printing charges
--	----------------------------	----------------------------

	Mono	Mono Duplex	Colour	Colour Duplex	Mono	Mono Duplex	Colour	Colour Duplex
UEA	3p	6p	30p	60p	3p	6p	100p	200p
Mean average	5p	9p	22p	38p	10p	17p	46p	83p
Median average	5p	9p	20p	40p	10p	16p	41p	75p
Modal average	5p	10p	20p	40p	10p	20p	50p	40p

Photocopying costs at other institutions were largely unavailable as the prices mirror the charging for printing. At present UEA charges different amounts for printing and photocopying.

	A4 Photocopying costs		A3 Photocopying costs	
	A4 Mono	A4 Colour	A3 Mono	A3 colour
UEA	6p	50p	12p	100p

Alternative technology to deliver student network printing

Multifunctional devices (MFDs) are capable of printing in mono and colour, copying and scanning documents all from a single device. Users also benefit from increased functionality with the option of scan-to-email enabled.

Student experience benefits of moving to an MFD fleet include:

- Replacing the mix of existing hardware with MFDs will allow users to carry out any function from any ISD managed MFD device in any location that they are provided resulting in an improved student printing experience.
- MFDs offer greater reliability compared to laser printing devices resulting in an expected reduction in the number of users with support issues. During a sample week the IT Helpdesk report that there are approximately two faults per day reported with the current hardware.
- MFDs would be fitted with card readers which allow users to swipe their campus card to authorise, manage payment and release the printing and copying functionality. This will offer an improved user experience allowing them quicker release of their documents compared to existing arrangements where a student has to log in to a print release workstation to release documents.
- Print speeds are slightly faster on MFD devices (55 pages per minute) compared with LaserJet devices (52 pages per minute). However, MFD devices print the initial page at 3.1 seconds compared to 8.5 seconds. Based on a sample analysis 73% of printing takes place weekdays between 09:00 and 19:00 indicating that load is not evenly spaced throughout the day. Quicker 'first page to print' times will enable greater availability of devices available for printing during the peak periods.

- MFD devices have higher capacity paper trays ranging from 2,000 to 3,000 pages compared to existing models that hold 500 pages. Larger paper trays reduce the frequency that they need to be filled saving on potential device outage and maintenance time. Analysis of load shows that during peak demand a single device prints in the region of 4,000 pages per day requiring the existing devices to be loaded up to eight times.

Sustainability benefits of moving to an MFD fleet include:

- UEA's Sustainable Procurement Guide concludes that MFDs consume less power than desktop laser printers. Furthermore, the total number of MFDs required to meet user demand would be fewer than the existing fleet of laser printers, print release workstation PCs, monitors, photocopiers and scanners.

Based on an estimate of all devices operating a daily pattern of 12 hours in active mode and 12 hours in sleep mode, each MFD would consume 1496.5 kWh less than a laser printer connected to a print release station with monitor over a twelve month period.

- Duplex printing has a lower environmental impact in terms of paper usage. Data for the academic year 2011/12 shows that over 75% of all printing on ISD managed student network printing devices are comprised of jobs that have 2 or more pages. Enabling duplex printing as the default option could save the use of approximately of 1.3 million pieces of A4 paper over a year if printing volume remains the same.
- Discussions with Ricoh, UEA's preferred supplier of MFDs, confirms that the manufacturer approves and supports the use of selected recycled paper.
- The footprint of the fleet will be reduced enabling greater utilisation of floor space to help improve services for students. An additional eight student workstations could be located in Library Floor 0 (24hr area) in place of existing printers and print release workstations.

Impact of moving to MFD devices:

- Homogeneity between device hardware is a key concept in deployment and configuration and enables a cleaner user interface for students.
- Student network printing charges set by ISD cover hardware, software, consumable, maintenance and support costs. The current charging model is historic and reflects the component costs of delivering each element of the service. MFDs facilitate any student to print, copy or scan from a single device, therefore, introducing MFDs prompts a review of charging models to reflect the changes in functionality and technology available.

Faculty student network printing review

- Some faculties and schools have implemented different printing solutions based on historical, local and financial arrangements.

Faculty/ School	Software	Location of printers	Charge per side	Credit arrangements
SSF	PaperCut	LSB 01.22	3p	None
HUM	PaperCut	ARTS 01.21 TPSC MBA Library ARTS 0.24	3p	None
NSC and RSC	Pcounter	Queens 1.20 Queens 2.20 (x2) BIOMED 02a Edith Cavell Building	2p 4p for colour	NSC - £48 pa RSC - £60 pa
MED	PaperCut	MED Floor 0	3p	None
BIO	PaperCut	SCI 0.12	3p	None
CHE	Print Manager Plus	4 laser devices shared between CHE and PHA	3p	CHE (all UGs)- £9 per semester
PHA	Print Manager Plus		3p	PHA UG1 - £9 per semester PHA UG2 - £13 per year PHA UG3 - £14 per year PHA UG4 - £27.50 per year
INTO Norwich	PaperCut	INTO 0.07	3p	None

- Over 450,000 sides are printed annually on Print Manager Plus and Pcounter systems. CHE/PHA contributes over 440,000 towards this volume.
- Different print management systems and technologies create a different user experience dependent on which faculty or school students belong to. Printing arrangements and charging are not consistent for all students across the whole university.
- Multiple print systems require additional hardware, support costs and energy consumption. Existing systems, if retained, should be moved to appropriate hardware and maintained as resilient and secure services.

Item	Cost	Note
Toner	£5,000	Covers 20 cartridges, each printing 24,000 pages to meet annual demand of 461,598 sides
Printers	£3,500	Replace each of the existing 14 devices on a five year cycle
Paper	£2,500	
Hardware	£3,000	Both Pcounter and Print Manager Plus run on obsolete hardware. To run these systems inside the ISD DataCentre on supported hardware would cost £7,750 for each system over a period of five years.
Total annual costs	£14,000	

- The servers running Print Manager Plus and Pcounter are not monitored by ISD but service outages are likely to impact on the student experience. Print Manager Plus is hosted locally within the school and has no resilience in the hardware design.
- Any change to faculty student network printing provision must address the existing credit arrangements established and introduce a consistent charging model that reflects total costs, future demand and student expectations.

Student network printing service recommendations

1. Recommendation 1 - Deliver ISD student network printing service utilising MFD technology.

- The change to MFD technology will realise all of the functional benefits and sustainability benefits outlined in this paper in ISD managed locations.
- 24 MFDs would replace the existing 42 ISD devices extending provision with a more comprehensive distribution enabling full functionality on each device in each ISD managed location.

Building	Floor/Room	Number MFDs	Number of Cash Acceptor Machines
Library	02	1	
	01	2	1
	0	10	2
	1	4	
	2	1	
	3	1	
Arts	1.02	1	1
	1.05	1	
ITCS	1.02	1	1
	1.26	1	
	0.17	1	

- Additional costs to move to MFD technology are incurred. Set-up costs will be approximately £30,000. Ongoing costs are likely to rise by £12,000 per annum.

	Year 1	Year 2	Year 3	Year 4	Year 5
Change in ISD financial position	-£43,000	-£12,000	-£12,000	-£12,000	-£12,000

2. Recommendation 2 - Change to the cost of printing and photocopying (two options).

Option 1 – Align printing and photocopying charges to the lower level fee of 3 pence per side.

- The introduction of a single device for both printing and photocopying will make the current differential charging model difficult to justify.

- In considering printing charges we cannot ignore the impact on student satisfaction.
- If we reduce the photocopy charge to match the current printing charge then this would impact ISD revenue by an additional 30K pa.

	Year 1	Year 2	Year 3	Year 4	Year 5
Change in ISD financial position	-£73,000	-£42,000	-£42,000	-£42,000	-£42,000

Option 2 – Increase printing and photocopying charges but introduce a level of free printing for all students.

- Student expectations have changed and it may be appropriate to provide all students with a level of free printing and photocopying. Several models have been explored using historic data to model the impact on students and ISD budgets of changing the charge and introducing a level of free printing. Further detail is included as an appendix.
- The model that we recommend would be to set mono printing and photocopying at 5p with duplex at 8p, colour 25p and provide all students with a £10 credit allowance. The table below models the impact that we think this would have on students based on current printing behaviours.

	3p per side	5p with £10 credit (200 sides)	Variance
75% of users print up to 200 sides	Pay up to £6	Would pay £0	£6 better off
12.5 % of users print an average of 300 sides	Pay up to £9	Would pay £5	£4 better off
12.5% of users print an average of 900 sides	Pay up to £27	Would pay £35	£7 worse off

- The additional impact on ISD costs is shown below

	Year 1	Year 2	Year 3	Year 4	Year 5
ISD costs	£111,500	£77,000	£77,000	£77,000	£77,000
Change in ISD financial position	-£88,500	-£53,000	-£53,000	-£53,000	-£53,000

- **The IT forum is invited to consider the two options and provide advice to ISSC on the best way to proceed and endorse a request for additional funding via the CUBS process.**

3. Recommendation 3 - Faculty provision of student network printing services should be integrated into the centrally provided solution.

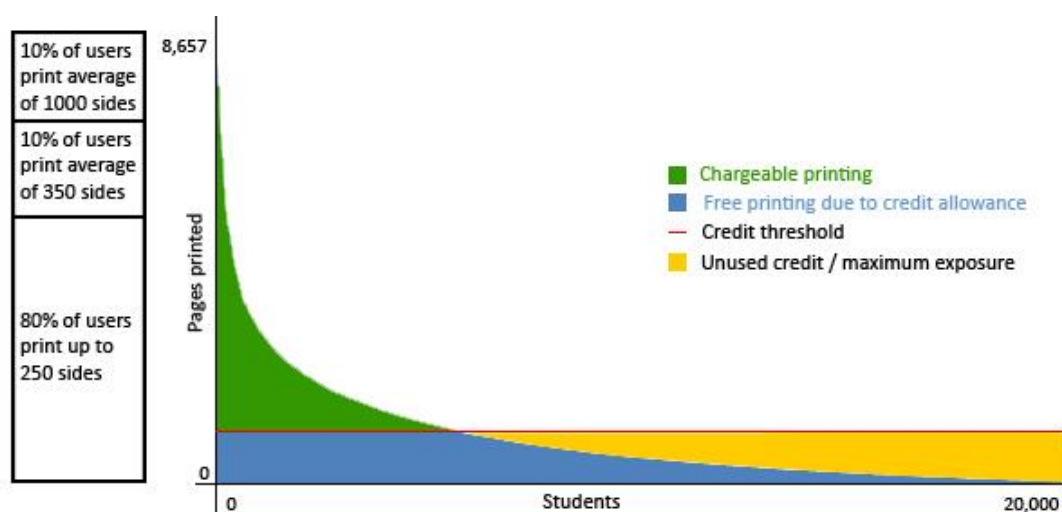
- This will enable all students to print in all locations securely using a common interface, experience improved reliability, and take advantage of the functional and sustainability benefits outlined. It would still be possible under this model for Schools and departments to maintain differential print credit levels for students should they wish.
- The current provision of faculty student network printing services introduces inconsistencies and inequality for students. Some students are provided credit with certain limits whilst others are not. Credit is not transferable between systems.
- The duplication of service provision increases support and hardware overheads.
- The exact number of MFD devices and the locations they are deployed to would be determined in consultation with faculties and central university departments taking into account demand, support and costs.
- **We are asking the IT Forum to approve the recommendation that a single system is used.**
- **The view of the IT Forum is invited as to whether schools and departments should retain differential levels of free printing or align on a University common standard.**

Appendix - MFD student network printing charge options

The following assumptions are made:

- Moving to a universal MFD fleet for all student network printing will provide significant benefits for students in terms of reliability and functionality.
- A consistent and appropriate charging and credit allowance for is expected by students.
- A combined demand of 3.9 million sides will remain consistent.
- Each faculty provided printing device will be replaced with an MFD when evaluating costs. A detailed review would be required to determine the exact number of devices required and the locations they are needed in. Costs increase by £15,000 with an additional £3,500 required in year 1 to install embedded readers on MFD devices.
- 98% of all printing is mono.
- A balance needs to be found that delivers improved services to students at charging levels that meet expectations and which does not require significant additional investment by the university.

The graph below illustrates the current pattern of demand for this ISD service. The majority of users print relatively low volumes whilst 10% are heavy users of the service. Changing the variables of price or amount of credit given to students has an impact on the amount that students pay for this service.



a. Mono charged at 3p, colour 25p, no credit allowance

	Year 1	Year 2	Year 3	Year 4	Year 5
ISD costs	£111,500	£77,000	£77,000	£77,000	£77,000
Change in ISD financial position	-£75,500	-£41,000	-£41,000	-£41,000	-£41,000

Impact on students of charges set at 3p per side

80% of users print up to 250 sides	Pay up to £7.50
10 % of users print an average of 350 sides	Pay up to £10.50
10% of users print an average of 1000 sides	Pay up to £30.00

b. Mono charged at 3p, colour 25p, 250 pages credit allowance

	Year 1	Year 2	Year 3	Year 4	Year 5
ISD costs	£111,500	£77,000	£77,000	£77,000	£77,000
Change in ISD financial position	-£139,500	-£104,000	-£104,000	-£104,000	-£104,000

Impact on students

	3p per side	3p with £7.50 credit (250 sides)	Variance
80% of users print up to 250 sides	Pay up to £7.50	Would pay £0	£7.50 better off
10 % of users print an average of 350 sides	Pay up to £10.50	Would pay £3	£7.50 better off
10% of users print an average of 1000 sides	Pay up to £30.00	Would pay £22.50	£7.50 better off

c. Mono charged at 4p, colour 25p, 250 pages credit allowance

	Year 1	Year 2	Year 3	Year 4	Year 5
ISD costs	£111,500	£77,000	£77,000	£77,000	£77,000
Change in ISD financial position	-£120,500	-£85,000	-£85,000	-£85,000	-£85,000

Impact on students

	3p per side	4p with £10 credit (250 sides)	Variance
80% of users print up to 250 sides	Pay up to £7.50	Would pay £0	£7.50 better off
10 % of users print an average of 350 sides	Pay up to £10.50	Would pay £4	£6.50 better off
10% of users print an average of 1000 sides	Pay up to £30.00	Would pay £30.00	No better or worse off

d. Mono charged at 5p, colour 25p, 250 pages credit allowance

	Year 1	Year 2	Year 3	Year 4	Year 5
--	--------	--------	--------	--------	--------

ISD costs	£111,500	£77,000	£77,000	£77,000	£77,000
Change in ISD financial position	-£100,500	-£65,000	-£65,000	-£65,000	-£65,000

Impact on students

	3p per side	5p with £12.50 credit (250 sides)	Variance
80% of users print up to 250 sides	Pay up to £7.50	Would pay £0	£7.50 better off
10 % of users print an average of 350 sides	Pay up to £10.50	Would pay £5	£5.50 better off
10% of users print an average of 1000 sides	Pay up to £30.00	Would pay £37.50	£7.50 worse off

e. Mono charged at 5p, colour 25p, 200 pages credit allowance

	Year 1	Year 2	Year 3	Year 4	Year 5
ISD costs	£111,500	£77,000	£77,000	£77,000	£77,000
Change in ISD financial position	-£88,500	-£53,000	-£53,000	-£53,000	-£53,000

Impact on students

	3p per side	5p with £10 credit (200 sides)	Variance
75% of users print up to 200 sides	Pay up to £6	Would pay £0	£6 better off
12.5 % of users print an average of 300 sides	Pay up to £9	Would pay £5	£4 better off
12.5% of users print an average of 900 sides	Pay up to £27	Would pay £35	£7 worse off