Higher education students with disabilities' perceptions of emergency remote learning – exploring the benefits and barriers of e-learning

Introduction

Emergency remote teaching/ learning is defined as a 'temporary shift of instructional delivery to an alternate delivery model due to crisis circumstances' (Hodges et al 2020). Following the closure of Irish higher education (HE) physical campuses on 13 March 2020 due to Covid-19 measures (Department of Education and Skills 2020), this was employed as a form of e-learning to enable Irish HE students to complete the remainder of their semester.

Research studies have indicated that engaging in e-learning can provide a more accessible learning experience for some students with disabilities, as it can allow for increased flexibility in the pace of study, increased time for information processing, and reduce the need for disclosure (Kent 2016; Terras et al 2015; McManus et al 2017). However, this mode of delivering learning and assessment can also pose technical accessibility barriers, challenges in self-management skills, and communication difficulties for certain groups of students with disabilities (Seale 2014; Pearson and Koppi 2002; Yuknis 2014; Roberts et al 2011).

This research paper aims to explore the perceptions of students with learning differences, health conditions and disabilities (referred to as students with disabilities in the remainder of the paper) of the benefits and barriers of e-learning present in emergency remote learning. An online survey was conducted with students registered with a Disability Support Service (DSS) in an Irish HE institution following the completion of their semester 2 studies to examine this topic. The paper links its findings to national surveys carried out during this time and contributes to current literature on e-learning and people with disabilities, with the most significant finding being that asynchronous delivery addresses a number of barriers that students experienced.

Benefits and barriers of e-learning for students with disabilities

E-learning and emergency remote learning

E-learning 'is often used as a unifying term to describe the fields of online learning, web-based training and technology-delivered instruction' (Seale 2014) including synchronous (in real-time) or asynchronous (taking place offline / not in real-time) delivery. E-learning can be considered a more inclusive learning experience if designed properly based on accessibility and universal design principles (Seale 2014; Yuknis 2014). Various aspects of e-learning have been found to benefit different groups of students with disabilities compared to face-to-face learning, thus removing some barriers such as physical or social factors which can impact the completion or extension of students' studies (Gierdowski and Galanek 2020). It must be acknowledged that emergency remote learning is not equivalent to e-learning, for example, the UK Open University takes over two years to develop most online modules (Rainford 2020). However, Irish HE students were engaged in a form of e-learning during the Covid-19 period of semester 2 (March-June 2020), often typically conducted through their existing VLE (virtual learning environment), and therefore a subject worth exploring further.

Benefits of e-learning for students with disabilities

Features of e-learning that can benefit students with disabilities, compared to face-to-face learning on campus, include:

- **Increased flexibility**: managing study at own pace and ability to build in breaks - increasing attendance (Gierdowski 2019; Kent 2016; Lambert and Dryer 2018).
- **Allowing more control over learning**: being able to pause and replay recorded lectures addressing focus and concentration issues (Campbell 2020; Terras et al 2015).
- **Promoting UDL (universal design for learning) approaches**: providing information through multiple means, such as video, captions, and notes (Hashey and Stahl 2014; Yuknis 2014).
- **Reducing physical effort and promoting independence**: reducing /eliminating commuting time, physical access of buildings, and reliance on personal supports (Gierdowski 2019; Pearson and Koppi 2002).
- **Reducing the need for disclosure and promoting anonymity** (McManus et al 2017; Zhang et al 2020; Lambert and Dryer 2018; Pearson and Koppi 2002).

Many aspects of e-learning outlined above corresponded to features present in emergency remote learning. For example, NADP (2020) noted during Covid-19 that asynchronous delivery enabled more flexible study and fewer reasonable accommodations were required in the exam setting for UK students with disabilities. The Trinity Ability Co-op personal stories (2020) highlighted positive aspects of remote learning for students with disabilities, such as being able to pause lectures and go over them again, the availability of all lecture resources in advance, flexibility of schedule - being able to fit lectures into their time, and not having to be on campus or in lecture halls which can be a stressful experience for some students.

Barriers of e-learning for students with disabilities

However, elements of e-learning can also pose some barriers to students with disabilities, often in terms of accessibility: ‘the ability of the learning environment to adjust to the needs of all learners’ (IMS Global Learning Consortium 2004). These include:

- **Issues with navigation and structure of the VLE, online tools, and interaction/ compatibility with assistive technologies** (Seale 2014; Kent 2016; Gierdowski and Galanek 2020).
- **Inaccessible instructional methods** (Yuknis 2014) **and different mediums** (live classes/ videos): availability of captions especially for students with hearing impairments (Terras et al 2015; Pearson and Koppi 2002).
- **Increased reliance on self-management skills**: managing tasks online presenting concentration/ scheduling challenges (Terras et al 2015; Roberts et al 2011) and pressure on organisational skills/memory (Pearson and Koppi 2002; Hollins and Foley 2013).
- **UDL approaches not being adopted**: heavily text-based teaching materials (Pearson and Koppi 2002).
- **Assessment methods**: formats not suiting remote delivery such as group work (Kent 2016).
- **Delayed communication and remote access to lecturers/peers/support services**: asynchronous/delays in responses (Williams 2017).

Some similar issues were reported during Covid-19, for example, Irish students with disabilities stated difficulties in interacting with new ways of learning and assessment due to accessibility issues such as enabling captions; the set up /lack of equipment; compatibility of their assistive technology with the VLE /assessment software, especially for

students with visual impairments, specific learning differences, hearing impairments and dyspraxia (AHEAD 2020). UK students with disabilities had comparable issues with multi-tasking skills involved with online conferencing; using different platforms; captioning; inaccessible PowerPoint slides affected neurodiverse students, and students with mental health difficulties had heightened anxiety which impacted on concentration abilities (NADP 2020).

During emergency remote learning students had to contend with new ways of learning, assessment, communication and interactions while managing any additional pressures and challenges in their home environment, and thus had a varied experience - as a number of national studies have indicated (USI 2020; AHEAD 2020; NUS 2020; NADP 2020). An Irish HE student survey reported that some students had a 'high degree of flexibility from their college', whereas others cited issues with inaccessible learning material, as well as 'difficulty accessing usual supports remotely and inflexibility regarding extensions' (USI 2020, p.11).

It is evident that both positive and negative aspects emerged for students with disabilities during emergency remote learning, some of which were linked to e-learning features and was an area that warranted further investigation by this study.

Research methodology

The research question was around the perceptions of students with disabilities' of emergency remote learning, in the context of the benefits and barriers of e-learning. A research survey design approach was used to create an online survey using LimeSurvey and sent to 800 DSS students who undergone emergency remote learning in March - June 2020. The survey had 33 closed and open questions under three sections

- **Experience of Remote Learning and Assessment**
- **Technical Ability and Accessibility**
- **Disclosure/ Requesting Supports**

to allow for gathering quantitative and qualitative data, as the inclusion of the student voice is crucial in research with people with disabilities (Holland 2015). It gathered some basic personal details to examine trends while protecting anonymity.

While the survey's validity is untested, its design was informed by other research surveys on e-learning and students with disabilities (Roberts et al 2011; Terras et al 2015; Kent 2016; Kotera et al 2017; Williams 2017), and UCI's survey of students' perception of online learning (UCI Office of Information Technology 2014). Emergency remote learning specific questions were based on EDUCAUSE (2020) and AHEAD (2020). Plain English guidelines on language and designing accessible forms (NALA 2008; University of California 2020) were applied, which aided reduction in measurement errors in completion and increased reliability and validity (Ponto 2015). The survey was piloted with a DSS graduate student, DSS staff, and educational researchers to anticipate any problems of comprehension (Walliman and Appleton 2009, p.172) and avoid leading questions and potential bias (Robson 2011, p.255; 264).

The survey response rate was 8% (n= 64), and while the survey sample was small, its profile was compared against the 2019/20 DSS student profile (CIT Access Service 2020) and was broadly similar in terms of student type, course level, and year of study with a slight increase in Honours 4th Year students responding [Table 1]. Therefore, the sample could be seen as fairly representative of the DSS college population, except there were no

responses from students with visual impairments. Students were self-selecting in responding and students without internet access may have been excluded from completing the survey. While the findings came from a single source it was rich in qualitative data derived from the survey comments.

Profile of respondents	number	% percent	DSS 2019/20
Type of student			
Full-time student	57	89%	93%
Part-time student	6	9%	7%
Mature student	1	2%	6%
Level of course	**n**	**%**	**DSS 2019/20**
Higher Certificate (Level 6)	2	3%	2%
Ordinary Degree (Level 7)	22	34%	40%
Honours Degree / Higher Diploma (Level 8)	39	61%	55%
Masters/ PhD (Level 9 / 10)	1	2%	3%
Year of study	n	%	DSS 2019/20
1st year	20	31%	30%
2nd year	19	30%	28%
3rd year	8	13%	24%
4th year	15	23%	15%
5th year or higher (postgraduate)	2	3%	3%
Course Subject Area	n	%	DSS 2019/20
Agriculture / Horticulture, Forestry, Fisheries and Veterinary	1	1%	2.9%
Arts and Humanities (includes Media and Music)	9	14%	12.9%
Business, Administration, Law	10	16%	23.6%
Computing / Information and Communication Technologies	6	9%	7.1%
Education	3	5%	2.8%
Engineering, Manufacturing and Construction	13	20%	22.3%
Health and Welfare	4	4%	5.9%
Services	5	8%	10.9%
Science, Maths and Statistics	11	17%	10.8%
Social Sciences, Journalism and Information	1	2%	1.0%
Other	1	2%	0.0%
Primary Learning	n	%	DSS 2019/20

Profile of respondents	number	% percent	DSS 2019/20
Difference / Health Condition / Disability			
Autism spectrum / Asperger's	9	14%	9.9%
ADD /ADHD	0	0%	3.2%
Blind/ Vision impaired / Sight loss	0	0%	1.2%
Deaf / Hard of hearing / Hearing loss	6	9%	2.3%
Dyslexia / dyscalculia (specific learning difference)	18	28%	34.4%
Dyspraxia /Development Coordination Disorder (DCD)	7	11%	16.9%
Mental health	9	14%	9.0%
Neurological	1	2%	4.0%
Physical / mobility	3	5%	6.8%
Significant ongoing illness	9	14%	9.3%
Speech and language communication difficulty	2	3%	4.0%
Other	0	0%	0.7%

Table 1 – Profile of survey respondents compared to DSS profile 2019/20

Research Findings and Discussion

The survey findings were approached thematically by examining the students' experience of emergency remote learning and comparing features of these against the benefits and barriers of e-learning identified in the literature review. Even though the sample was small (n=64), the positive aspects and concerns expressed by students in the study reflected many of the national studies as well as the e-learning research. **The overall outcome of the research confirmed some of the national survey findings for students with disabilities, where asynchronous delivery enabled improved communication and learning for the students surveyed, as well as addressing unreliable internet connections.**

Experience of Remote Learning and Assessment

The majority (84.5% n=54) of the students surveyed rated their overall experience of remote learning and assessment as positive or ok (Figure 1) and felt their disability was accommodated in this environment (86% n=55) (Figure 2). 77.2% (n=43) of students had only some previous experience of studying a course with some /a few online materials and/ or coursework (Table 2). Other concurrent surveys indicated that Irish students with disabilities had a varied experience of remote learning. AHEAD (2020) found that over 50% (especially HE undergraduates) had a negative experience learning from home and the highest negative rating was amongst students with mental health difficulties, ADD/ADHD, specific learning differences and significant ongoing illnesses. A Trinity College Dublin survey of 90 DSS students reported that 49.5% had a positive experience of online

learning, 18% felt it was mixed, and 29% said it was negative (Ní Hoireabhaird 2020).

This particular cohort of students who responded to the survey had an overall improved experience in comparison to the above surveys but also reported factors influencing this – some linked to features of e-learning. One student noted that they liked the opportunity, **'more time for independent study'** and others felt they had good access to notes/resources/lecturers. Some students said their experience improved once they got used to the technology and online lectures. Those with a negative experience mostly studied Honours degrees, 50% had dyslexia and largely had no or little previous experience of online courses which may have impacted on their remote learning. They indicated difficulties with hardware, internet connections, and managing other commitments.

Figure 1 – Rate your overall experience of remote learning and assessment

Figure 2 – Student satisfaction rating of college to accommodate disability in remote learning and assessment

Closed questions options - Previous studying online experience	number	% percent
Course with a few online materials, but lectures and coursework were in person	23	35.9%
Course with some online coursework, but most of the coursework still completed in person	20	31.3%
None of my coursework up to now had any coursework online	16	25.0%
Course with most of the lectures/coursework online, but still completed in person	3	4.7%
Course with all lectures/coursework online	2	3.1%

Table 2 – Student experience of studying online before Covid-19

Benefits of e-learning within emergency remote learning

The elements of e-learning that benefit students with disabilities include increased flexibility; more control over learning; increased UDL approaches; reduction of physical effort and disclosure. The students surveyed indicated that the greatest benefits for them lay in the flexibility and control over learning present in asynchronous delivery. 50% (n=32) of the students commented on the benefits of asynchronous lectures (Table 3). The availability of recorded lectures and materials meant students had more control over their study and attendance, such as those

with medical conditions:

Having the option to view recordings of classes instead of attending the live classes were helpful in times when I had flare ups of my illness or needed to go to a hospital appointment at the time of a live class. I wish this option was available before the pandemic as it was a source of stress having to catch up when a class was missed.

This corresponded to **'increased flexibility'**, and **'control over learning'** features present in e-learning. Kent linked this element with increased quality of life but also that e-learning allowed students to work with what he called the 'limitations' of their disability (2016, p.55), addressing some environmental/ societal factors may create barriers for full participation in education.

The benefits of studying online versus the physical campus were also highlighted in survey comments, especially by students with mental health difficulties:

'I did not feel as much pressure, as when I go to class in college my anxiety and panic attacks tend to be higher as I do not like walking into classrooms late.'

And also by students with physical disabilities or medical conditions, where they had more control over their environment and schedule:

'I could work from the comfort of home rather than college classroom, which was extremely uncomfortable ergonomically and caused a lot of back pain.'

This 'reduction of physical effort has had a positive impact on attendance reported in a study on US students (Gierdowski 2019, p.9).

23.4% of students (n=15) indicated that they had increased ability to manage their own time and workload - such as feeling less pressure when working on assignments and studying where they **'can take breaks when needed'**. Asynchronous delivery also facilitated different rates of processing information to take notes, and revise for assignments or exams to **'go back and watch something I didn't grasp straight away'**. It also addressed internet connection issues highlighted in the next section. These elements related to **'control over learning'** where Terras et al (2015, p.337) found that individualised pacing in asynchronous courses enabled students with learning differences to succeed academically.

23.4% (n=15) also noted they had increased access to lecturers and additional course materials that would not ordinarily be available. The range of material (notes, videos, tutorials) connects to 'UDL approaches' where information is available through multiple means of representation which engages different kinds of learners (CAST 2018). The **'reduction in the need for disclosure and improve anonymity' in e-learning** outlined by McManus et al (2017, p.337) was also noted in student comments on remote assessment, where some no longer required exam supports, eliminating the need to disclose: **'I was able to use my laptop for everything without requesting'**. Only 7.8% (n=5) indicated that they had to disclose to lecturers during Covid-19, possibly as exam supports were not facilitated by lecturers (Figure 3).

The areas highlighted clearly correspond to those e-learning features that benefit students with disabilities and may have contributed to the positive experience rated by the respondents.

Coded responses – Helpful aspects of remote learning	number	percent %
Asynchronous lectures	32	50.0%
More control over how they studied	15	23.4%
Access to Lecturers/ Notes/ Tutorials	15	23.4%
Change in assessment	11	17.2%
No commuting	9	14.1%
No positive aspects	5	7.8%

Table 3 – Student comments on helpful aspects of remote learning and assessment for their studies

Figure 3 – Student disclosure to lecturers before and after Covid-19 closure of campus

Barriers of e-learning within emergency remote learning

Barriers within e-learning for people with disabilities have been identified in the areas of the use of VLE / online tools and their interaction with assistive technology (AT); inaccessible teaching methods and mediums; reliance on self-management skills; lack of UDL approaches; assessment methods; and delayed communication. In the survey, students were asked a range of questions around any challenges they experienced, their technical ability and access to technology. Communication delay and internet connection issues were found to be the most problematic.

46.9% (n=30) of the students commented on the level of lecturer communication /support (Table 4) impacting on assessment information/feedback. They indicated email was not always the best communication tool, while acknowledging lecturers were very busy and receiving higher volumes of emails. This appeared to affect students with dyslexia, on the autism spectrum and mental health difficulties the most: **'Found it difficult to ask certain questions to lecturers through emails and many questions I was given were very hard to understand' and 'I didn't find it as easy to access the support and to ask questions to my lecture.** This area corresponded to **'delayed communication and remote access to lecturers and peers'** that can be present in e-learning for students who may prefer face-to-face communication (Williams 2017, p.55). Asynchronous communication issues were also prevalent in **'assessment methods'** where 26.6% (n=17) students had difficulties managing and completing remote groupwork, which was also impacted by internet connection problems. This largely affected students with mental health difficulties, dyslexia and significant ongoing illnesses.

Coded Responses - Unhelpful aspects of remote learning	n	%
Lecturer Communication/Support	30	46.9%
Groupwork	17	26.6%
Independent Learning/ Learning Online	14	21.9%
Synchronous Lectures / Remote learning & assessment Schedule	13	20.3%
Exams/ Assessments	11	17.2%

Coded Responses - Unhelpful aspects of remote learning	n	%
Internet Connection Issues	9	14.1%
Increase in Workload	6	9.4%
Subjects/Coursework Translated Online	6	9.4%
Technical issues	5	7.8%
None	4	6.3%
Peer support/Interaction	3	4.7%

Table 4 – Unhelpful aspects of remote learning and assessment for students' studies

Although asynchronous communication has been found to benefit students with disabilities as it may allow more time to process information and participate (Dunn 2003, p.53), the delay in communication during this time appeared to have a larger impact on the students, where several mentioned increased anxiety as a result of these issues. Kent outlined that personal communication from lecturers/tutors within 24 hours is valued by students with disabilities studying online courses (2016, p.21;23), and students with communication difficulties may require a UDL approach (Pittman and Heiselt 2014) with more than one way of accessing relevant information. The survey respondents who had positive experiences of lecturer communication cited having areas in the VLE for example to allow peer support and lecturer interaction was beneficial.

73.4% of students experienced one or more technological challenges (Table 5), citing **internet and technical difficulties** with browsers and audio thus impeding their access to synchronous/live learning and assessments, as well as downloading content and uploading assignments. 40% (n=26) of students had issues with access to reliable internet - this was a larger proportion compared to the national figure of under a third of Irish students (USI 2020, p.5). One student simply stated **'Poor Internet connection = bad online classes'** and a student with a hearing impairment linked it accessing to their support.

Closed question options - Technological challenges	n	%
My access to reliable internet/broadband	26	40.6%
I didn't experience any of these challenges	17	26.6%
Unclear expectations around which technologies/applications I was required to use	14	21.9%
My access to library resources	13	20.3%
Lecturer not being comfortable using/lack of familiarity with required technologies/applications	11	17.2%
My lack of technical skills and/or own discomfort with required technologies/applications	8	12.5%
My access to specialised software required by my course	8	12.5%
My lack of familiarity with required technologies/applications	7	10.9%
Lack of guidance on how to use new technologies/software required by the course	7	10.9%

Closed question options - Technological challenges	n	%
My access to reliable communication software/tools	6	9.4%
My access to a reliable digital advice	6	9.4%
Adequate digital replacements for face-to-face collaboration tools	4	6.3%

Table 5 – Student Technological Challenges for remote learning and assessment

Most students indicated that they had no difficulties using common software/tools before Covid-19 (Figure 4) which is similar to a national survey of digital skills which confirmed the majority of students would have accessed their VLE previously (National Forum 2020, p.44). Only a very small number of students indicated significant difficulties due to their accessibility needs with accessing online learning platforms / tools such as Canvas (VLE), college website and Other software needed for my course (Table 6).

Figure 4 – Student ability to use technologies before Covid-19

Platform/tools	Yes	%	Somewhat	%	No	%	N/A	%
Email	1	1.6%	5	7.8%	44	68.8%	14	21.9%
Microsoft Word	1	1.6%	3	4.7%	45	70.3%	15	23.4%
Microsoft Excel	1	1.6%	1	1.6%	33	51.6%	16	25.0%
Microsoft Powerpoint	2	3.1%	1	1.6%	39	60.9%	16	25.0%
Canvas	4	6.3%	7	10.9%	37	57.8%	15	23.4%
Whats App	0	0.0%	2	3.1%	22	34.4%	20	31.3%
Instagram	0	0.0%	3	4.7%	19	29.7%	21	32.8%
YouTube	1	1.6%	3	4.7%	29	45.3%	20	31.3%
Facebook	1	1.6%	2	3.1%	23	35.9%	21	32.8%
Twitter	1	1.6%	3	4.7%	15	23.4%	20	31.3%
PDFs	4	6.3%	8	12.5%	32	50.0%	15	23.4%
College website	0	0.0%	3	4.7%	39	60.9%	18	28.1%
Zoom / Skype	3	4.7%	11	17.2%	22	34.4%	17	26.6%
Other video calls	1	1.6%	6	9.4%	29	45.3%	17	26.6%
Software needed for my course	4	6.3%	6	9.4%	22	34.4%	21	32.8%

Table 6 - Difficulties accessing online learning platforms/tools due to student accessibility needs

When asked around technical accessibility difficulties (Table 7), accessing extra time for exams was the chief concern for students, along with other areas such as accessing AT and captions, and spellcheck enabled in VLE exams. This corresponded with **'inaccessible instructional methods'** (Pearson and Koppi 2002) and **'issues with VLE, online tools'** (Seale 2014) listed as potential barriers within e-learning.

These findings would reflect the varied experience of fo the students surveyed. Not unsurprisingly, students who had no previous or very minor experience of online study, had increased negative overall ratings for remote learning and assessment compared to the overall respondents (Table 2) 42% (n=27) of students indicated that in future (Table 8) they would prefer a blended approach to study which combines both face-to-face and online approaches, and nearly a third (n=20) preferred the more traditional format that they would have experienced pre-Covid-19.

Closed question options - Technical accessibility issues	n	%
Time on exams/ tests	28	43.8%
I didn't have any accessibility issues	20	31.3%
File converting	7	10.9%
Access to assistive technology software	3	4.7%
Exam Test proctoring	3	4.7%
Access to assistive technology hardware	2	3.1%
Availability of live captioning on video conferencing	2	3.1%
Access to ISL interpreters / Stereotype	2	3.1%
Other	2	3.1%
Availability of closed captioning	1	1.6%
Integrating captioning into video /webinars	0	0.0%

Table 7- Student technical accessibility issues that have been challenging for remote learning and assessment

Closed question options – Future type of course	n	%
Combination of meeting in class/lecture setting & completing coursework online	27	42.2%
Meeting regularly in a class/lecture setting, rather than completing lectures/coursework online	20	31.3%
Course all in person with no online element	9	14.1%
Completing lectures/coursework online, rather than meeting regularly	5	7.8%

Closed question options – Future type of course	n	%
in a class/lecture setting		
Fully online course	2	3.1%
Other – ‘don’t mind’	1	1.6%

Table 8 - Type of course/study format preferred in the future

Conclusion

Overall, the outcome of this research was that students’ perceptions of emergency remote learning was quite positive but the impact of unreliable internet connection creates multiple barriers for students with disabilities accessing their learning and supports.

While the research involved was a small-scale study, its findings have value as they echo national studies, as well as linking to existing e-learning research. While the circumstances of Covid-19 would have had some impact on the student’s experience of remote learning, it seems clear that features of e-learning that both benefit and challenge students with disabilities are present within this form of learning. The USI national survey (2020 p.11) found that Irish students ‘with disabilities including mental health issues and students with poor internet connections were amongst the most adversely impacted by the move to online learning', and this needs to be taken into account for any future delivery of remote learning and assessment in order to improve accessibility for students with disabilities.'

Farrell and Brunton (2020) outline the factors for successful online learning are structural influences such as course design, access to reliable equipment and the internet, and it also requires students to have higher organisational skills, a structure for learning, and to balance this with pressures of life commitments. Students did not have a choice in the sudden move to e-learning imposed by Covid-19, leaving them somewhat unprepared in terms of structure, equipment and broadband/ internet access, as well as possessing varying experience in using the VLE and various technologies. While students with disabilities had similar experiences to their peers confirmed by national studies, some elements such as access to the internet seemed to disadvantage them more in not being able to engage in learning at their own pace, access to supports, and assistive technology for example. Taking a universal design approach to remote learning ensuring accessible content, teaching practices and asynchronous delivery would enable a wide range of students with different life commitments, IT and internet access, and a range of learning styles, to participate fully in their studies.

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