



# Usability tests on bioinformatics mobile applications

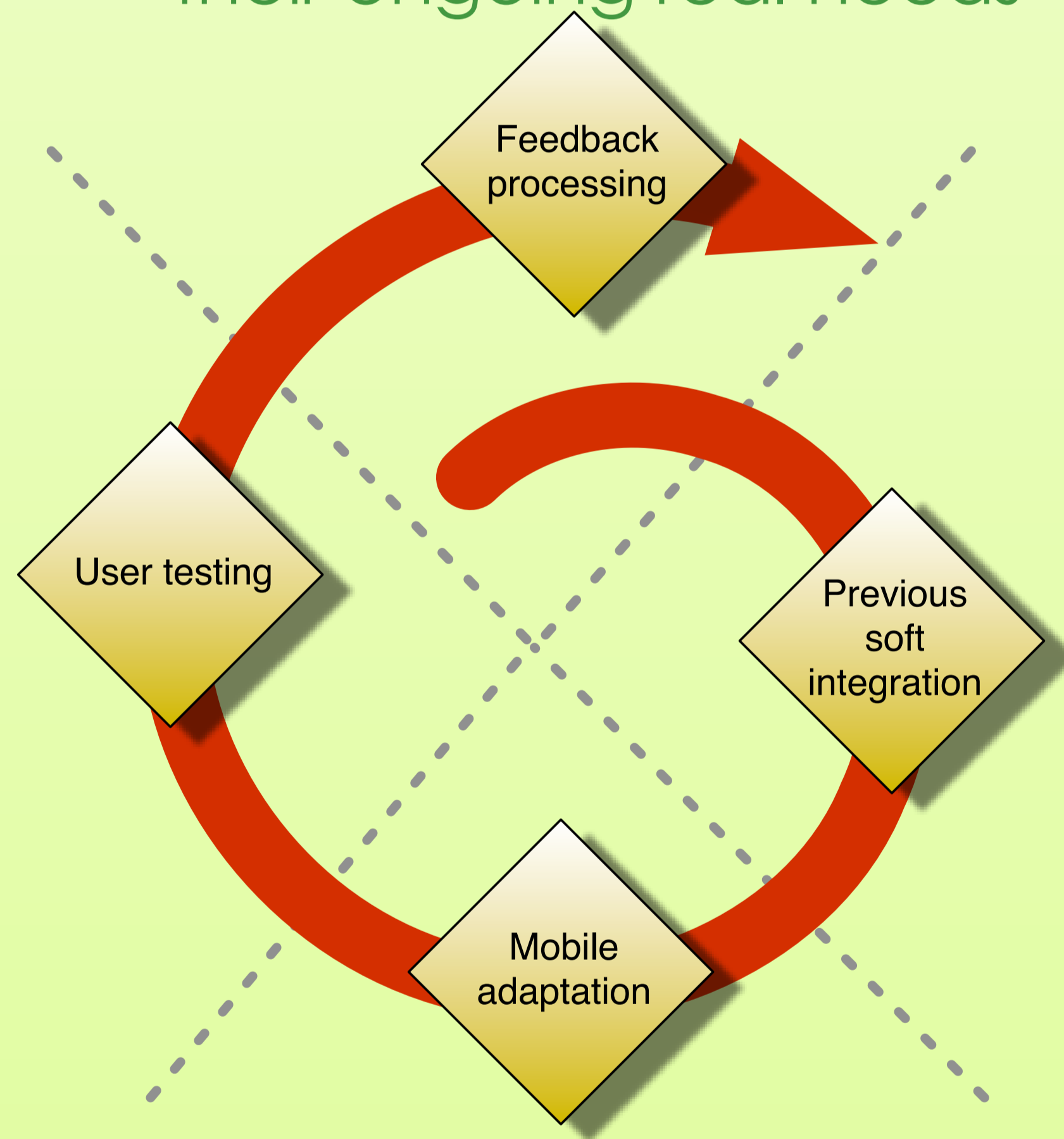
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**Mr.SymBioMath (MrSBM)** Is a Marie-Curie IAPP-EU project on High Performance, Cloud and Symbolic Computing in Big-Data Problems applied to Mathematical Modelling of Comparative Genomics and biomedical applications.

**Mobile devices** are experiencing a dramatic increased use among clinicians and researchers. Current bio-apps are not mature enough for a serious bioinformatic use. We are addressing the key aspects that these particular interfaces and situations present to the user. In doing so, we have developed an ambitious framework for an open list of services easy and friendly accessible able to give useful results on the mobile

## Motivation

Our goal is to put in practice standard protocols for keeping track of user experience and interaction activity with our mobile apps. This information is being used to improve the user experience and to know better their ongoing real needs



Users followed scripts to solved well known biological questions, answered questionnaires and interviewed. Two usability exercises were performed: (1. Blast and 2. Homology search and an easy phylogenetic study on a given amino acid sequence). For the selected tasks the user decided the parameters values of choice and, after enacting the tasks

## Conclusions

Users representing bioinformaticians, biologists, physicians and researchers on the field are the real protagonists and these usability tests reinforce the urge to develop new mobile applications for bioinformatics and data management, considering their possible mobile situations, but the model of development has necessarily to be changed, as interaction in mobiles is their critical point and this implies that users must be kept tracked all the time. Even when the app is being continuously enhanced, it already is a real step forward on what we researchers are in need in this era of mobiles and big data transfer, not only in data standardisation, but in services access, and usability

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Bioinformatics available mobile apps 2014-08				
App name	Performs	Advantajes	Disadvantajes	Link
CloningBench	Helps to do cloning experiments, in every detail based on tables for each kind of enzymes, etc.	Up to the point, it helps with the details for this kind of experiments. Free	Not updated since 2011	<a href="https://itunes.apple.com/es/app/invitrogen/id458617772?mt=8">https://itunes.apple.com/es/app/invitrogen/id458617772?mt=8</a>
Promega	View, run and annotate Promega protocols. Run timers directly from the relevant steps, and when complete, email the annotated protocols for printing, etc	Interesting tool for this lab users. Free	Specific	<a href="https://itunes.apple.com/es/app/promega/id307546949?mt=8">https://itunes.apple.com/es/app/promega/id307546949?mt=8</a>
Phylogram	Visualization of phylogenetic tree	Allows to synchronize tree files using iTunes from wherever	Just for iPhone, not intuitive, does not handle landscape, can't get to file selection. Low interactivity. Difficult to zoom-handle-interactive even with small phylogenetic trees.	<a href="https://itunes.apple.com/us/store/apps/details?id=399814043?mt=8&amp;is=1">https://itunes.apple.com/us/store/apps/details?id=399814043?mt=8&amp;is=1</a>
Biocatalogue	Browse the catalogue for services, service providers. REST endpoints and SOAP Operations	Informational app, handles landscape and portrait. Free	Is more like a web site. Information is minimal, no links. Unorganized, plain lists, non hierarchical nor contents organized. Quite difficult to browse or search through.	<a href="https://itunes.apple.com/us/app/biocatalogue/id450120348?mt=8&amp;is=1">https://itunes.apple.com/us/app/biocatalogue/id450120348?mt=8&amp;is=1</a>
EdgeBio	It allows access to all their content from the EdgeBio blog, website and their online communities	Unifies all digital resources of EdgeBio blog. Free. Interacts via social networks	It is more a link to videos and on line resources than a tool or app. Not access from all countries	<a href="https://itunes.apple.com/us/app/edgebio/id515313935?mt=8&amp;is=1">https://itunes.apple.com/us/app/edgebio/id515313935?mt=8&amp;is=1</a>
SimAlign	iOS touch application that interfaces with NCBI BLAST service to align a provided sequence or Accession.	Saves all queries allowing users to recall and resubmit searches. iOS and Android	It is not comfortable to use, many dialogs for the only task it can do: NCBI blast. It depends on registered users. It is unable to handle files, you must copy-paste or type the entire sequence in a small textbox. It is based on registering and not free accounts.	<a href="https://itunes.apple.com/us/app/simalign/id432818873?mt=8">https://itunes.apple.com/us/app/simalign/id432818873?mt=8</a>
SimGene	Interfaces with Simbiot, Ensembl, NCBI, etc., to retrieve annotation info for over 30-species, based on gene and symbol search	iOS and Android	Same user interface and uncomfortable handling as SimAlign. It is based on registering and not free accounts.	<a href="https://itunes.apple.com/us/app/simgene/id427723492?mt=8">https://itunes.apple.com/us/app/simgene/id427723492?mt=8</a>
Oh BLAST It!	Executes BLAST	Simple. Free	Only Android. It doesn't have a real graphical user interface, but a kind of black screen where everything is displayed and entering as command lines	<a href="https://play.google.com/store/apps/details?id=com.bioinformaticsapp">https://play.google.com/store/apps/details?id=com.bioinformaticsapp</a>
Gene Aligner	This program uses the Needleman-Wunsch and Smith-Waterman algorithms for pairwise gene global and local alignment, respectively.	Simple. Free. The sequences can be entered in two different ways: string of characters or NCBI accession number. The program can also generate a dot plot for the alignment.	Only Android. It doesn't have a real graphical user interface, but a kind of black screen where everything is displayed and entering as command lines	<a href="https://play.google.com/store/apps/details?id=itd_gene.activities">https://play.google.com/store/apps/details?id=itd_gene.activities</a>
NEB Tools / New England Biolabs Inc	Enzyme finder for restriction enzyme finding information on any NEB enzyme	Complete, well documented and organised. Free	Quite specific for this labs	<a href="https://itunes.apple.com/es/app/neb-tools/id350346827?mt=8">https://itunes.apple.com/es/app/neb-tools/id350346827?mt=8</a>
RCSB PDB	Official mobile app of the RCSB PDB (Protein data bank)	Amazing database, with molecular 3D rendering.	Depends on internet connection. Only querying	<a href="https://itunes.apple.com/us/app/rcsb-protein-data-bank/id529153183?is=1&amp;mt=8">https://itunes.apple.com/us/app/rcsb-protein-data-bank/id529153183?is=1&amp;mt=8</a>
PCR Essentials	Interact Remotely with your Proflex™ PCR system. Product information on Taq Polymerases, dNTP, Gels and stains, RT-PCR products, cDNA products and master mixes, etc.	Smart interface, high quality app. Free	Specific	<a href="https://itunes.apple.com/es/app/pcr-essentials/id606990640?mt=8">https://itunes.apple.com/es/app/pcr-essentials/id606990640?mt=8</a>
DrugBankWP	Chemical, pharmaceutical and pharmacological	Complete	WindowsPhone only	<a href="http://www.windowsphone.com/es-es/store/app/drugbankwp-968f1d8e-0e67-4c2a-b733-16bfcfd4f51c">http://www.windowsphone.com/es-es/store/app/drugbankwp-968f1d8e-0e67-4c2a-b733-16bfcfd4f51c</a>
DNAApp	Open ab1 files	Open and visualise sequences from Dropbox (in iOS). New versions save also in fasta format	Simple. Not well adapted to common gestures in mobiles.	<a href="https://itunes.apple.com/us/app/dnaapp/id859446942?mt=8">https://itunes.apple.com/us/app/dnaapp/id859446942?mt=8</a>
Evolutionary Biology	Concept to teach evolutionary concepts	Simple	Covers only quite a few topics in Bioinformatics, it's very simple and take no advantage of the interactive capabilities of the device. Not free	<a href="https://itunes.apple.com/us/app/evolutionary-biology/id513464425?mt=8&amp;is=1">https://itunes.apple.com/us/app/evolutionary-biology/id513464425?mt=8&amp;is=1</a>
Gen Tutor	iOS version app for students taking a standard College level course in Genetics	Extensive and complete based on levels of knowledge. Free	A tool for students, following a course	<a href="https://itunes.apple.com/es/app/gene-tutor/id534062019?mt=8">https://itunes.apple.com/es/app/gene-tutor/id534062019?mt=8</a>
Gene Link	Quick short course in molecular genetics	High quality material. High quality and well organized number of topics. Tools for researchers. Free	Only tools for handling one sequence, simple ops	<a href="https://itunes.apple.com/es/app/array-genetic-tools-from-gene/id399712676?mt=8">https://itunes.apple.com/es/app/array-genetic-tools-from-gene/id399712676?mt=8</a>
Nature ENCODE	It helps to navigate through the 30 papers published in Nature, Genome Research and Genome Biology as the ENCODE Project	Amazing presentation of the state of the art in the most important papers published	iPad only	<a href="https://itunes.apple.com/es/app/nature-encode/id553487333?mt=8">https://itunes.apple.com/es/app/nature-encode/id553487333?mt=8</a>
MyGenome/ Illumina, Inc	Explore real human genome	Graphic, health implications, educational, quite complete. Good graphics, a lot of information on genetic diseases. Cheap.	iPad only	<a href="https://itunes.apple.com/es/app/mygenome/id516405838?mt=8">https://itunes.apple.com/es/app/mygenome/id516405838?mt=8</a>
Human Genome	Obtain graphical info between diseases and genes, syndromes or traits	Graphical, pedagogic, free	iPad only	<a href="https://itunes.apple.com/es/app/human-genome/id576939342?mt=8">https://itunes.apple.com/es/app/human-genome/id576939342?mt=8</a>
MIQE qPCR	Helps with technical support on particular qPCR experiments. Based on characteristics, it offers articles and depending on your problem, particular advise	Essentially useful. Kept updated, with active version supporting. Free	Quite specific, documentative.	<a href="https://itunes.apple.com/es/app/MIQE-qPCR/id423650002?mt=8">https://itunes.apple.com/es/app/MIQE-qPCR/id423650002?mt=8</a>
Real-time PCR	Clearly organised set of documentative resource on experiment preparation and results interpretation on PCR	Attractive, easy to use, a lot of information. Update. Free	Specific, documentative	<a href="https://itunes.apple.com/es/app/real-time-pcr/id523157743?mt=8">https://itunes.apple.com/es/app/real-time-pcr/id523157743?mt=8</a>
Talking Glossary of Genetics	By National Human Genome Research Institute, more than 250 common genetic terms pronounced and explained in an easy-to-understand way by leading scientists and professionals at the National Human Genome Research Institute (NHGRI).	Great pictures, explanations, comprehensive and balanced explanations on every genetic topic. Free	Heavy, only educational	<a href="https://itunes.apple.com/es/app/talking-glossary-of-genetics/id428340581?mt=8">https://itunes.apple.com/es/app/talking-glossary-of-genetics/id428340581?mt=8</a>
Protocolpedia	For lab researchers. Offline access to hundreds of complete protocols	Light, complete. Well organised and supported by real users. Includes videos. Free	Not updated since 2011	<a href="https://itunes.apple.com/es/app/protocolpedia/id396334248?mt=8">https://itunes.apple.com/es/app/protocolpedia/id396334248?mt=8</a>
BioTechLCD	Access to bioinformatics and genomic information	Free	More than an app is an informative tool-a blog	<a href="http://www.androidpit.de/android/market/apps/com.globetech.biotechdaily/biotech-daily">http://www.androidpit.de/android/market/apps/com.globetech.biotechdaily/biotech-daily</a>
BioGene	A search and information tool for biological search. A quick reference for any gene	Really documentative. Well organised. Free	Specific for genes	<a href="https://itunes.apple.com/es/app/biogene/id333180084?mt=8">https://itunes.apple.com/es/app/biogene/id333180084?mt=8</a>
BioGenie	Multitask system to be used by biologist, scientist researchers, professors and students	Help using those services	Specific	<a href="http://bio-genie.com/node?page=2">http://bio-genie.com/node?page=2</a>
Gene Lab	iOS educative game on creating creatures based on their genes	It permits to experiment essentially with the Mendel laws and mutation concept	Simple concepts, only recreational	<a href="https://itunes.apple.com/es/app/gene-lab/id320762322?mt=8">https://itunes.apple.com/es/app/gene-lab/id320762322?mt=8</a>
Gene Pool	Game. iOS	Amusement	Simple concepts	<a href="https://itunes.apple.com/es/app/gene-pool/id330408920?mt=8">https://itunes.apple.com/es/app/gene-pool/id330408920?mt=8</a>