



# Usability in bioinformatics mobile applications

what we are working on

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# The problem

- Over a million apps for mobiles

but on bio we have accounted only 20-30 barely usable because

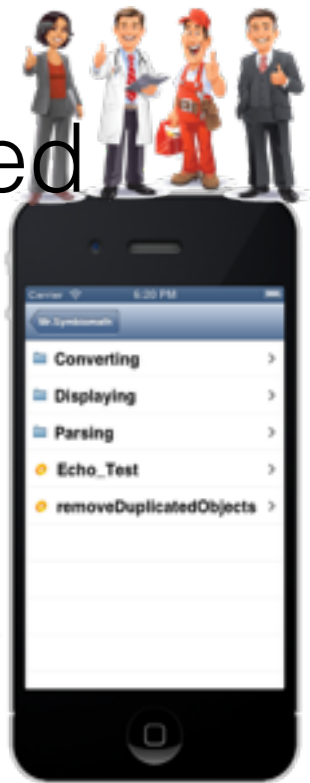
- bad user interfaces
- not powerful or ambitious goals
- bad treatment of data and/or the role of the devices in these processes

Bioinformatic 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/cloningbench-by-invirogen/id458617777?mt=8">https://itunes.apple.com/es/app/cloningbench-by-invirogen/id458617777?mt=8</a>	
Promega	How, run and annotate Promega protocols. Run them directly from the app and when complex, mail 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 own 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-interact even with small phylogenetic trees.	<a href="https://itunes.apple.com/us/app/phylogram/id399814043?mt=8&amp;is=1">https://itunes.apple.com/us/app/phylogram/id399814043?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 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 Simbit, 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/id42772349?mt=8">https://itunes.apple.com/us/app/simgene/id42772349?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=it.gene.activities">https://play.google.com/store/apps/details?id=it.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	Quite specific for this lab	<a href="https://itunes.apple.com/es/app/neb-tools/id508668272?mt=8">https://itunes.apple.com/es/app/neb-tools/id508668272?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, pharmacological and pharmaceutical database	Complete	WindowsPhone only	<a href="http://www.windowsphone.com/es-es/store/app/drugbankwp/968f1d8e-0e67-4c2a-b733-16bfcf04f51c">http://www.windowsphone.com/es-es/store/app/drugbankwp/968f1d8e-0e67-4c2a-b733-16bfcf04f51c</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/id854944694?mt=8">https://itunes.apple.com/us/app/dnaapp/id854944694?mt=8</a>	
Evolutionary Biology	Concept to teach evolutionary concepts	Simple	More as web site than application. Simple. It 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 student 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/gen-tutor/id534062019?mt=8">https://itunes.apple.com/es/app/gen-tutor/id534062019?mt=8</a>	
Gene Link	Quick short course in molecular genetics	High quality material. Wide range 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	MIQE with technical support on molecular 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 professional scientists.	Great pictures, explanations, comprehensive and balanced explanation 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.androidit.de/de/android/market/apps/app/com.globetech.biotechdaily/biotech-daily">http://www.androidit.de/de/android/market/apps/app/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/app/biogene/id333180084?mt=8">https://itunes.apple.com/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/id320762232?mt=8">https://itunes.apple.com/es/app/gene-lab/id320762232?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>	

# what we are doing

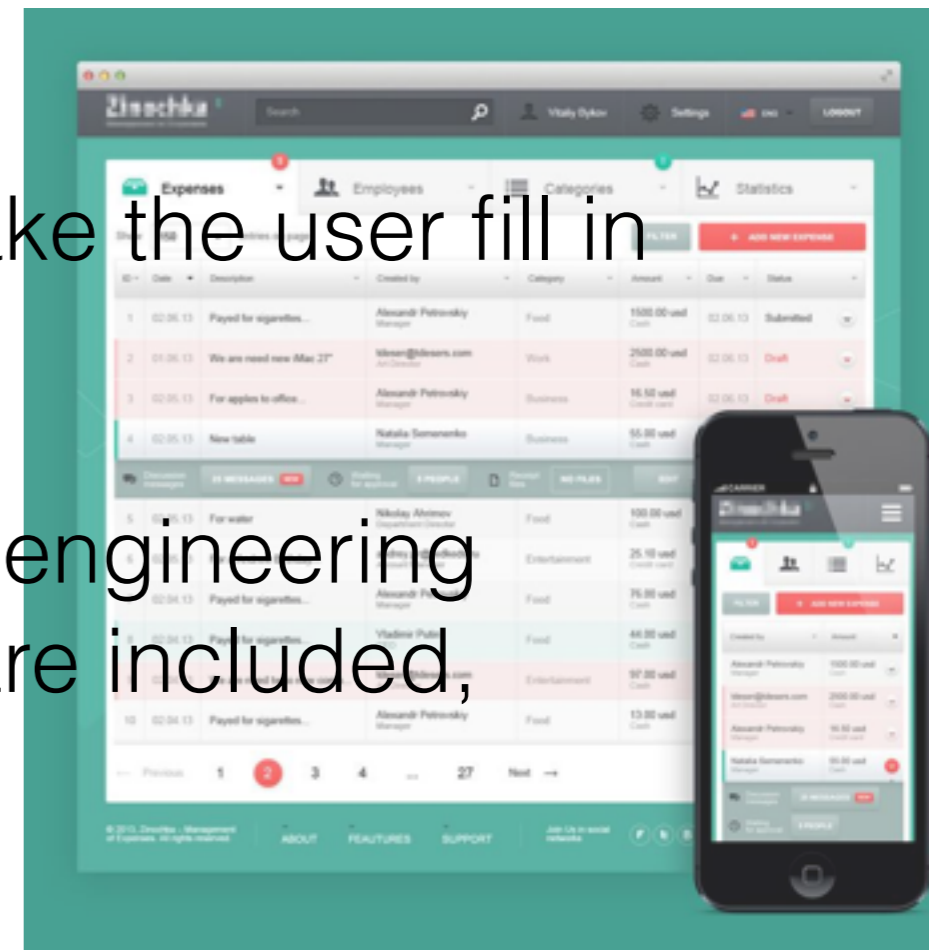
- First it was to develop native prototype apps
- Then tried to do it more universal and focused on **easy modifying interface** → web based that app
- Then started to make it for the user: a user centred app; and kicked off a thoroughly **user interface study** on that app



# the user evaluation process

Then have made users use the app

1. We built a script for the user to follow. In that script we simply put a ordinary situation the user needed to solve
2. Recorded the interaction, and make the user fill in a questionnaire
3. Collect everything and in a spiral engineering methodology, after the changes are included, repeat the process



# Important details



- The user must be a real external and independent person with that particular but common and easy to understand situation to solve with our app



- The app and its services and tools, needs to be flexible so that it can follow every modification its real use demands



- This mechanism of asking for user feedback is to be kept throughout the life span of the app and be an important part of the developing process