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Innovation, Technology and Leadership: A Paradigm Shift

Ellen Campbell Grizzle, PhD., R.PH., CPP

Associate Professor,

College of Health Sciences, University of Technology

Technological advances in Medical Research and Practice

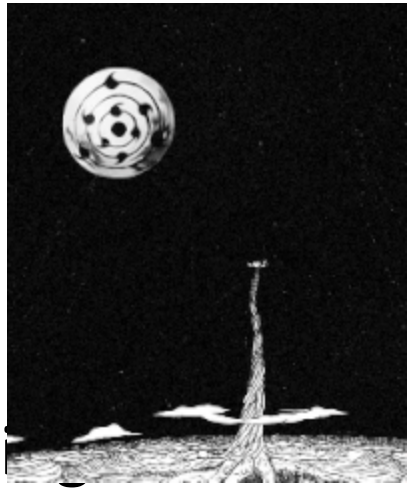
Technology enhances human capacity to manage the world ...
Prof. Aggrey Brown

….. is changing our brains

….is changing how we think

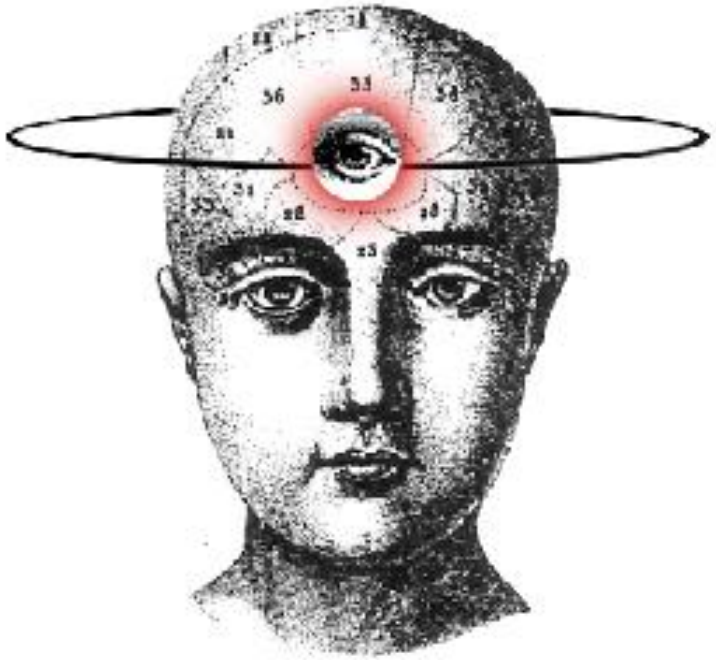
"Process by which humans modify nature"

Outline

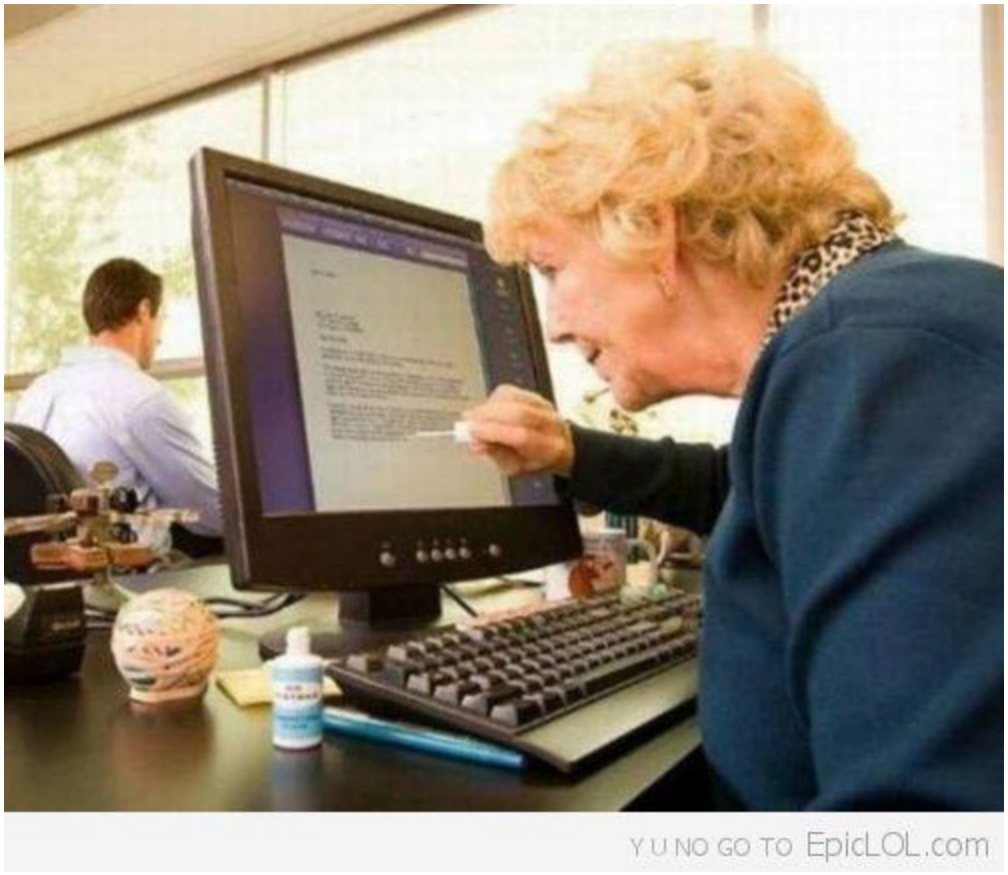


- Technological advances
  - Automation and IT
  - Product formulation and manufacturing
  - Biotechnology
  - Pharmacogenetics
  - Medical Cannabis and pharmacogenetics
- Implications for education, regulations and society
- Mitigation strategies

Technology.. Boon or bane



Work in progress



Automation and Information Technology

- Medication management-private and public sector, NHF. Third party payers
- More accurate and current patient records
- Information sharing between entities
- Inventory management
- Patient care- computer mediated counselling
- Online pharmacy
- Post marketing surveillance- incidence reporting
- The informed patient
- Use of robotics
- Telemedicine

Tablets and capsules

Immediate or conventional release

Modified release dosage

Extended release e.g controlled-release, sustained-release, and long-acting drug products.

Delayed-release drug products.

Targeted-release drug products.

Orally disintegrating tablets (ODT)

Biotechnology

- The use of biological materials to create a specific pharmaceuticals.
- Is an important sector of the pharmaceutical industry and accounts for the fastest growing class of new drugs in the market.

- Unleashed by the Human Genome Project

- The role of genetics in congenital defects, cancer, disorders involving the immune system, and other diseases that have a genetic link is clearer.

Biotechnology

- Big molecules such as Nucleic acid, protein and peptide drugs, and diagnostics are the main drug products emerging from the biopharmaceutical industry.

Pharmacogenetics

- *Pharmacogenetics* is the study of the genetic basis of individual patient variability in the response to drug therapy. Pharmacogenetics allows for individualization of the monoclonal antibody.

- Herceptin was designed to treat a subset of breast cancer patients who overexpress the HER-2 (human epidermal growth factor receptor-2) gene.

- Patients who lack HER-2 overexpression are considered to be non-responders to Herceptin therapy.

- In the past, such differences would be apparent only after a trial-and-error period.

- This genetic knowledge improves our ability to select or design the proper drug for individuals suffering from a disease with a varying range of molecular defects .

Implications for Medical CAnnabis

Pharmacogenetics and Cannabis

Steep Hill's Testing Products – QuantaCann2

Lab-based calibration models

- HPLC-MS Calibration
- GC-MS Calibration

Database

- World leader
- 100,000 samples tested

Cloud server

QuantaCann NIRS testing unit

- THCA
- CBD
- D9THC
- Moisture

Spectral scans

Reports

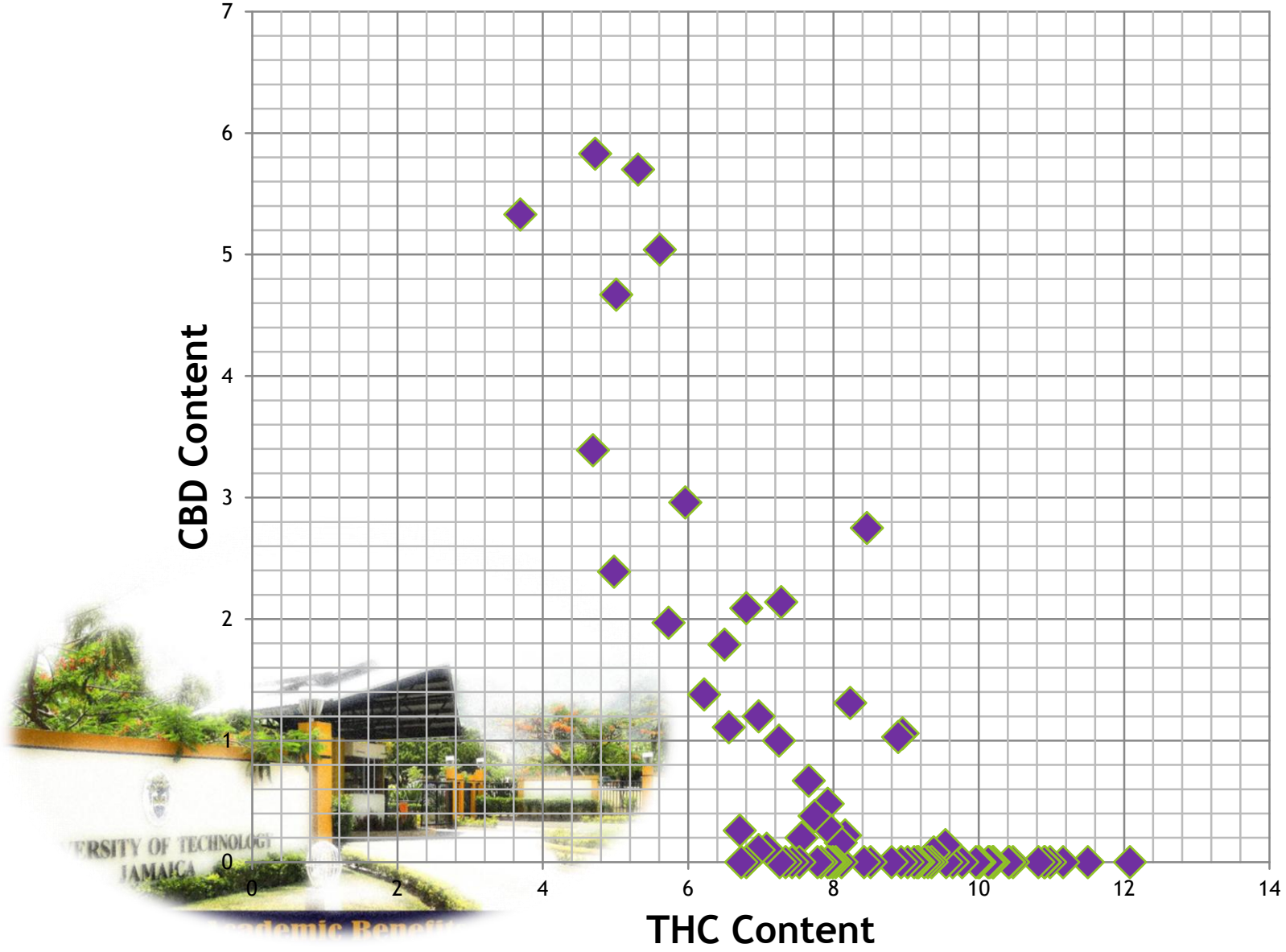
Data

QuantaCann web application [SaaS]

- Test results in 20 seconds
- Searchable local sample database

- Cloud-based analytics
- Results comparison to Steep Hill's global strain database

QuantaCann2 – Jamaica Prototype Experiment



THC Rich strains

Kandy Krush

Analysis Date: 10/25/13 **Type: Flower** **Sample ID#**

Pesticides:	PASS

Molds, Fungus:	PASS

Content for Unheated Plant Sample, % by wt*:

% THCA	% THC	% CBDA	% CBD	% CBN max
19.1	0.4	<0.1	<0.1	<0.1

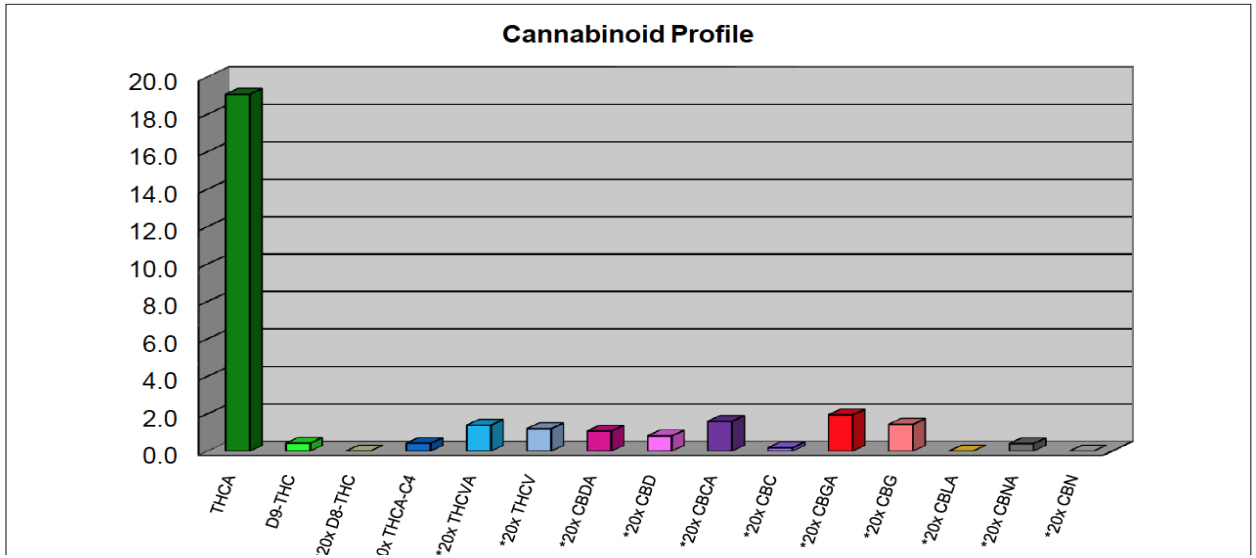
* % wt/wt with moisture content as delivered

Cannabinoid Profile, Unheated, % by weight*:

THCA	D9-THC	D8-THC	THCA-C4	THCVA	THCV
19.06	0.42	<0.03	<0.03	0.07	0.06

CBDA	CBD	CBCA	CBC
0.05	0.04	0.08	<0.03

CBGA	CBG	CBLA	CBNA	CBN
0.10	0.07	<0.03	<0.03	<0.03



Medical Cannabis and pharmacogenetics

- Endocannabinoid system deficiency
- Customized product development
- Personalized treatment

Implications for education

- Education and training transformed
- Separation of training for pharmacists
- Specializations
- Increased Advanced training

Regulatory and ethical standards

- Scope of practice
- Conditions of practice- consultation and patient education
- Liability
- Enhancement of patient and product security-

Cost of medicines to country

- Expanded use of pharmaceuticals in country
- Spiralling cost of pharmaceuticals-reduced affordability by the poor
- Generic Medicines a partial solution
- Spiraling cost of health insurance

Mitigation strategies

Reorientation in education and training philosophy

- Encourage innovation and creativity
- Production of knowledge

Government policy to encourage management of pharmaceuticals in Jamaica (JAMPRO and universities)

Further changes in Government policy and regulations to encourage:

- Investment /donations/endowments that in research and development

Active support for research in herbal Medicines as complementary therapies

Enhanced use of technology in practice to Derive real benefits for patients

Thank you!

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