Differentiation as a General Concept

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This post is philosophizing in a general way, probably more akin to the thinking of von Bertalanffy than Bowen.

Differentiation is a term which comes from biology and describes the process in which a non-specific cell specializes in relation to its neighbors. Relationship is embedded in this otherwise individual-centric term. Specialization implies a relative position inside a unit. Something that specializes is different from its peers. As it specializes, it differentiates.

If differentiation is a process that pertains to an individual cell, Bowen wrote about *differentiation of self* as the process that an individual person goes through in relation to their emotional system, particularly their family of origin. It describes the ability for a person to be an individual while remaining a part of the integrated system. I am beginning to see this differentiation concept apply to many other areas, and am beginning to think of this as a property which determines the adaptability of any system. Flexibility may come from a combination of increased complexity and coordination. Evolution implies increase in differentiation so long as the original function is not lost.

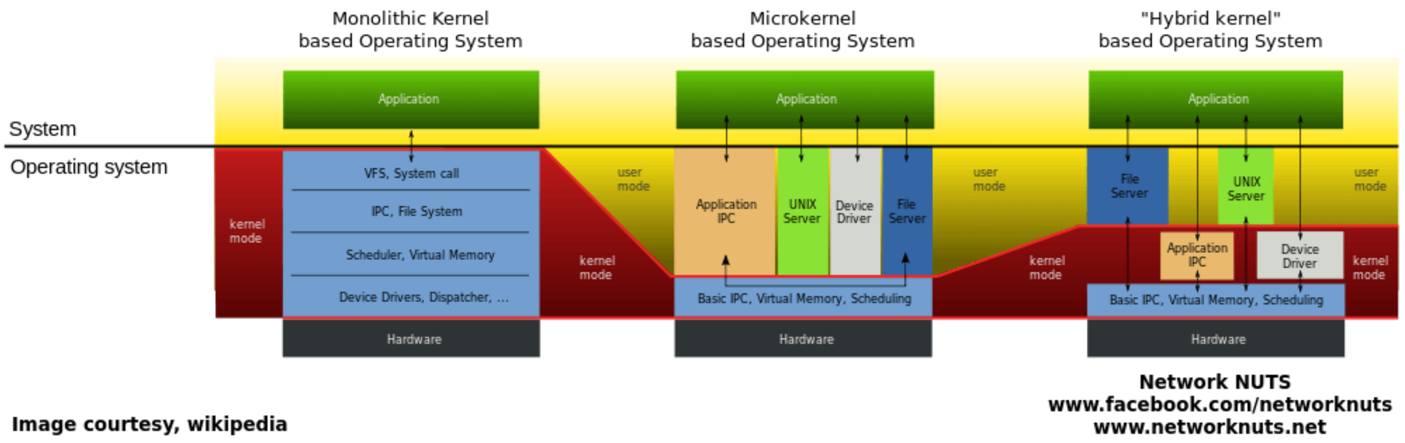
For example, the problem of adaptability is at the heart of good software design. When a developer begins a new project, they take a stab at the presenting problem. The software goes through an "embryonic" process called an alpha version until it seems to work fairly well given the understanding of the problem at that moment. At that point it becomes a beta version.

Then, edge cases are brought in. We want it to do X, but sometimes Y. The system is put to the real-world test. The software is modified to evolve. There are core principles which remain in the design, but it is adapted to accommodate each edge case. Sometimes the edge case is a new feature, or sometimes it is just handling more and more of the same work at once without crashing. Or maybe it's a beautifully designed website that falls apart at the first request for an additional feature from the client.

In my opinion, this is the fundamental challenge of software, and of life. When designing software, a developer may face many choices every minute that balance expediency over flexibility. Should I just copy the names of all of the audio effects to each drop-down box, a decision that will cost $400 each time the list needs to be updated? Or should I pull the list from a single data source, which will cost $800 up front?

Object-oriented (OO) software was, and still is, the software world's answer to this problem. OO is a language of modularity, of differentiation. You divide your software into modules with real-world analogues, like tire, rim, brake, axel, chassis, body, engine, transmission. Put them together and they drive. Taken away, and they don't. The system is indeed greater than it's parts, and "driving" is not evidenced in any one individual part.

Back in the 1990's, Microsoft started designing Windows NT as a better Windows 3.1/95. One reason it was "better" was that it had a modular kernel. One module could fail and the others would survive. In fact, the other parts might even repair or restart it. Steve Jobs started NEXT about the same time, developing the NextSTEP operating system in a highly modular way. Not only did these kernels crash less, but they allowed for more new features without having to redesign the entire system. These kernels remain the core of Windows and macOS operating systems today.


Monolithic Kernel based Operating System
Microkernel based Operating System
"Hybrid kernel" based Operating System
System
Operating system
Application
VFS, System call
IPC, File System
Scheduler, Virtual Memory
Device Drivers, Dispatcher, ...
Hardware
user mode
kernel mode
Application IPC
UNIX Server
Device Driver
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Basic IPC, Virtual Memory, Scheduling
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Good design balances expediency and adaptability.

Programmers who program because their learning edge is to think differentiation are the programmers who risk deadlines for the sake of good design. I am one of these. My mind benefits particularly from categorizing a heap and optimizing a system. That is another reason why I am not associated with any particular software field. It's all the same to me so long as the system is already within a range of differentiation and moving toward higher differentiation.

Hell for this kind of programmer is a client who doesn't know what they want, or a group of developers who are not unified behind common design principles. A project where the user base is creative *and also* oriented toward developing and maintaining core principles of function is a wonderful thing for this kind of programmer. The family diagram app is an example of this, as Bowen theory is rooted in knowing and maintaining core principles.

It seems like a systems science has the potential to produce a metric or principle for systemic health. I think this metric could be differentiation. A more differentiated system is more efficient. It's parts are greater in number, more well defined, and more highly coordinated. It can accommodate the highest number of stress cases without losing its original identity. This is all a matter of perspective, of course. A car doesn't make a good fountain pen. And so it may be that differentiation is tied to a particular functional context, for example survival in a particular environmental context.

I am starting to think that if you watch any organism or feat of engineering evolve over time without deviating from its originally intended purpose, a single property of evolution will emerge among them.

It seems to me that homo sapiens follows the same pattern. Cells, organs, brain hemispheres, families, societies, all differentiate. The brain is where all the complexity is in the individual, so differentiation there is the most compelling. The ability to choose between thinking and feeling as anxiety increases in the group is one example...being ones-self amidst one's most important relationships. A person's ability to exercise physically without their autonomic nervous system overfunctioning into a fight-or-flight response is another.

A more differentiated person is one in which one function (e.g. thinking) interferes less with another (i.e. feeling). A more differentiated family is one where the members are more able to be themselves without cutting off from the group. A more differentiated society is one where the states, provinces, or political factions are able to represent their respective positions while remaining interested in hearing and understanding other positions. They see their role as only ever valuable in relation to other roles *under the whole*.

A more differentiated software, automobile, or airline communication system is one which can handle more edge cases without losing its originally intended purpose. My diagramming app might handle 100 users as easily as it can handle 10,000,000 users. It might also be easy for me to add new features without breaking other features. An old boss of mine would always say "do X, but *no new bugs!!!"* My learning edge in that job was designing new features without breaking old ones. This was a combination of good design up front and rigorous testing before committing changes back to the main code repository.

In people, I think that higher differentiation means higher viewport diversity. Heterodox Academy is such a wonderful example of this. So far as I understand them, they are promoting differentiation in universities. I have applied to be a graduate-level member.

In my opinion, increasing differentiation is the way out of our political polarity and violence in society. That is, the ability to know ones own opinion without forming a mob to go after those who don't hold it. Defining life itself as a long stream of opportunities to remain in warm, civil discourse with people who have different opinions. Striving to differentiate opinion from fact in the heat of the moment, and curbing reactivity towards disagreement.

Most of what I see on broadcast and social media fails this test. I think that differentiation of self is an individual effort and always will be, though the term "self" may take on new meaning once we are all fueling of the Matrix.

If such a principle actually has an objective basis in nature, then it would be a magnificent contribution to life at all levels to operationalize it.