

跨界思維

Transdisciplinary Thinking

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A Talk Given by Dr. Raymond Yeh in the Online Sunday Evening Lecture Series on September 6, 2020

我今天要講的是一個現在相當流行的話題，雖然在25年、甚至40年前，這並不熱門。我記得，現在的哈佛大學曾經嘗試開辦一個跨領域的課程。

我今天的題目是對跨界思維及其相關應用的說明。許多年前，這並非熱門的話題。約莫四十幾年前，我在德州大學奧斯汀分校任教的時候，在計算機科學系開了一門「軟體工程」的課程。不久，我收到工程學院的通知，說理學院不能開設工學院的課程。所幸，我也是工學院的教授，院方也無法干涉太多。

但現今，全球都非常盛行跨領域這個概念。跨界思維的本質是整體性的概念。你們看這張圖，就像太極圖一樣—你中有我，我中有你。

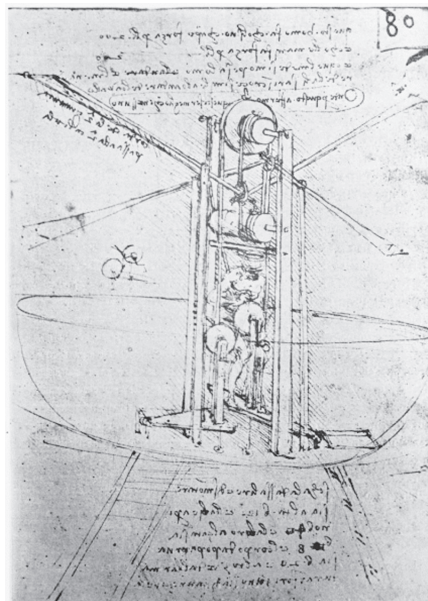
據我所知，達文西很可能是西方世界第一位跨界思維的學者。他是一位設計師、藝術家和科學家。為了理解現象，他把各種不同的理論和知識連結在一起，並試圖整合這些訊息、理出相似的模式。

有時，達文西會同時進行幾個計劃。當他在其中一個計劃獲得某些進展時，就會利用在該計畫獲得的新知識來更新其他的計畫。遺憾的是，因為他的這些工

What I'm going to talk about now is a quite popular topic in nowadays, however, some 25 or 40 years ago, it was not so popular. I remember that the present University of Harvard tried to put together a multi-disciplinary program.

My talk is on a note on transdisciplinary thinking and its applications. This topic was not so popular many years ago. When I was teaching at UT Austin, some 40 years ago, I was offering a new course called, "Software engineering" in the computer science department. Then I got a notice from the engineering college that science colleges cannot offer engineering courses. Fortunately, I was an engineering professor as well so they couldn't do much about it.

But today, the notion of transdisciplinary is very, very popular now all over the world. The essence of transdisciplinary thinking is the notion of wholeness. So you can see in this picture, it's like Tai Chi diagram that I am in you and you are in me.



達文西手稿

The Graphic Work of
Leonardo Da Vinci

The first transdisciplinary to my knowledge in the Western world is Leonardo da Vinci. In his lifetime, he was a designer, an artist, and a scientist. And what he did was that to understand the phenomena; he connected different kinds of theories and knowledge and tried putting them together to understand their similar patterns.

Sometimes he would work on several projects together. When he reached some progress on one project, he would then update all the others. Unfortunately, we don't know much about this work, because his notes were recorded in a notebook and very difficult to read.

作紀錄都寫在筆記本上而且相當難讀，我們對他的工作知之甚少。如果所有像牛頓這類的科學家能夠知道達文西的作品，這個世界就會相當不一樣。

直到幾年前，跨界思維的關鍵就是完整性（這與達文西的想法類似）。我們來深入討論這個問題。一般而言，幾乎每個人都會有「自我設限」的前提。

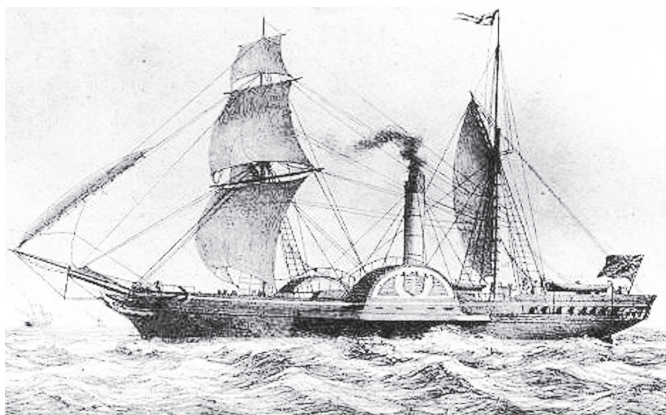
有次，蒸汽機發明家去見拿破崙，告訴他，自己有一個可以打敗英國海軍的方法。「只要把我的蒸汽機裝在你的船上，你的船就會比英國海軍的船還快，你就可以擊敗他們。」拿破崙沒有接受，因為他有一個「自我設限」，認為蒸汽機不能裝到船上，結果還是被英國打敗了。

過去我擔任顧問工作的時候，我常請參加者畫一張自畫像，大家畫的都是對自己的印象。

每個人畫完之後，我會像辦畫展一樣，把這些畫作展示在牆上。從畫作中，我認為85%的人都看到自己的羈絆是什麼，每個人各有不同：有的是房子的羈絆，有的是家人或地點等等的羈絆。

艾琳是我們的一個朋友。原本她是一個非常健康、樂觀的年輕女士。有次她哭著到我們家，因為醫師剛剛診斷出她得癌症。這是一種惡化速度相當快的皮膚癌，長在她的肛門上。她很快就搬到我們家，我們試著幫助她恢復健康。作為復原過程的一環，我們請她談談自己的缺點。

婚前，她原本是一個相當開朗的人，搬



蒸汽船 Steamboat

If all the scientists like Newton and others had known about da Vinci's work, then the world would have been different.

Until only a few years ago, the key to transdisciplinary thinking is wholeness; (it's not apart from Da Vinci's work). Let's discuss this further. In general, almost everyone has self-limiting assumptions.

Once the inventor of the steam engine went to see Mr. Napoleon and told him that he has a way to beat the British Navy. "If you just put my steam engine in your boat, then you will have a boat that's faster than any of the British Navy's and you can beat them." Napoleon did not accept his suggestion, because he had a self-limiting assumption that steam engine could not put in boat. Later Napoleon was beaten by British Navy.

Before while I was doing consulting work, I usually would ask participants to draw a self-portrait. What people drew was their impression of themselves. After everybody drew their picture, we hung them on the wall for all to see, and we had an art show. From the pictures, I think 85% of people see what they are tied up by. Everybody's tied to different things: some are tied by their houses, some by family, some by location, and so on and forth.

Irene is one of our friends. Originally she was a very healthy and optimistic young lady. One time she came to our house in tears because the doctors had just diagnosed her with cancer. It was a very aggressive skin cancer, growing in her anus. Pretty soon she moved into our house and we were trying to help her to recover. As part of the recovery process, we asked her to talk about her shortcomings.

She was a very happy person before she got married, but after she moved to Austin, she lived in a family with all PhDs, except herself. Everybody looked down on her, besides her husband, so gradually over 30 years she developed severe depression.

One day we sat down with her and let her write down 20 or so points why she thinks she isn't good enough. Then we asked her to link all of them together and discover that the root cause of that whole thing was her thought of "I am not good enough," because over 30 years, she was told she is not good enough.

The way we tried to help her was to think about her positives. We found out that she is a good mom, a good daughter, and a good employee. Her initial surgery was

到奧斯汀後，她住在一個除了她自己以外，全是博士頭銜的家庭裡。除了她丈夫，每個人都瞧不起她，因此在後來的三十年中，她逐漸產生嚴重的憂鬱症。

有一天，我們和她一起坐下來，讓她列舉二十多條她認為自己不夠好的地方。接著，我們讓她把列舉出來的全部連結起來，嘗試找出自己不夠好的根源。結果發現，她並沒有不夠好，只是這三十多年來，她總是被人說她不夠好，才會以為自己不夠好。

我們幫助艾琳的方法是讓她想想自己的長處。我們發現她是一個好母親、好女兒、好員工。她初次的手術並沒有將癌細胞清理乾淨，因此需要再次接受手術治療；於是葉媽媽陪伴她去休斯頓的癌症中心。在我們家休養了兩個月後，艾琳再度開朗起來。當她去看醫師時，她說：「進行手術的時候，能不能先切一點點（組織），看看是否有癌細胞；而不是馬上整個切掉，不然我可能就只能用人工肛門了。」

在醫院等了幾個鐘頭以後，檢驗報告出來了，沒有癌細胞了。醫師也告訴她：「我不知道這兩個月你做了什麼事情，不過你要繼續做，因為這不是我們有辦法幫你做的事。」從艾琳的故事中，我們學到：如果你能打破「自我設限」，對世界就會有不同的看法。

1979年，我在日本富士通研究院工作，因此當時認識了許多高科技人士。小林先生是日本電氣公司的董事長兼總裁。有一次，我和他在華府共進午餐，我問他：「逢低潮時，你做的最重要的事情是什麼？」那是當他知道日本電氣公司的現況無法長期維持的時候。當時，他決定到世界各地旅遊幾個月。回來之後，他決定將公司的方向從原本的能源領域轉為電腦和通信領域。他的公司規畫30年的發展路線圖，日本電氣公司的競爭領域也因此完全改變。

他們研究西南航空是如何創業，他們的地面和航空系統，以及他們的管理方式。比方說，航空公司會提供午餐，但是巴士並不提供這樣的服務。我想表達的是，如果運用跨界思維，你可以借助不同領域的知識來增長自己的優勢。

not cleaned up well, so she needed to have another one. So Priscilla accompanied her to Houston, the cancer center, and after almost two months of resting at our house, and she became happier again. When she went to the doctor, she said, "When you do the surgery, could you just cut a little bit first to see if there's cancer, instead of cutting off the whole thing right away, or else I might then be left with an artificial anus."

After waiting at the hospital for a couple of hours, the report came back. There were no more cancer cells. Then the doctor also told her: "I don't know what you have done over the last almost two months, but just keep on doing it, because it's not something we can help you." So the lessons from Irene's story is that if you break your self-limiting assumptions, you will perceive the world differently.

In 1979, I was working at Fujitsu Research Institute, so I got to know a lot of high-tech people then. Mr. Kobayashi was chairman and president of the Nippon Electric. Once when I had lunch with him in Washington DC, I asked him, "What's the most important thing you did when you became depressed?" It was when he knew that Nippon Electric Company's current situation would not hold for a long time. He decided to travel the world for a couple of months. When he came back, he decided to change the direction of Nippon Electric from an energy sector into computer and communication one. His company then put together a 30-year roadmap and changed the entire competitive space of NEC.

They studied how Southwest Airlines started their business, their ground and airline system, and how they



NEC前總裁小林宏治
Mr. Kobayashi, the former
chairman and president
of the Nippon Electric.

未來，我們會面對種種棘手的問題，從飢餓到氣候，所有這些問題，甚至是世界性的流行病。當這些問題匯聚在一起時，我們要如何處理這些重要問題呢？在我看來，每個問題都是由不同的因素構成，單單一個領域難以應付，必需使用跨界思維來克服問題。

我要分享南非的偉大實驗。1993年，當南非要舉行大選的時候，全世界都不看好，認為必將引發內戰。然而，這種情況並未發生，他們很順利地把原本的白人政府過渡到黑人領袖。他們之所以成功，是因為在選前他們進行了從總統請辭到各種可能性之間的深度討論。克勒克是下台的總統，曼德拉是第一位黑人總統。這裡有張照片，他們兩人都得到諾貝爾和平獎。



1993年，曼德拉和克勒克同獲諾貝爾和平獎。Nelson Mandela and Frederik Willem de Klerk both received Nobel Peace Prize in 1993.

他們成功的原因是，在大選前一年，有一個南非的組織邀請南非各個不同領域的領導人，舉行了為期一週的研討會。他們一起研議，不管哪個政府執政，南非的未來有哪些可能性。

他們歸納出四種狀況。

第一種狀況是駝鳥，代表白人政府的種族隔離政策，不管發生什麼事，只管把頭埋到沙裡去。第二種是跛腳鴨，意思是過渡的政府完全癱瘓。第三種是伊卡洛斯，這是一個希臘神話故事，講的是一個藝術家父親給兒子伊卡洛斯造了一雙臘翼，讓他們得以飛離被包圍的城市。伊卡

ran their management. For example, airlines provide lunches, but buses don't. The point I'm making is if you use transdisciplinary thinking, you can borrow from other disciplines and use them to your advantage.

In the future, we'll have a lot of tough problems, from hunger to weather, all of that, even the pandemic. When converged together, how do you deal with these top problems? In my mind, you need to use transdisciplinary thinking because each problem consists of different factors, so you cannot solve a problem with one discipline.

I'm going to share the great South African experiment. In 1993 when the South Africa was going to have an election, the whole world did not have good hope, because they thought a civil war would break out. However, nothing like that happened. They had a smooth election and transition from a white government to a black leader. They were successful because they engaged in deep dialogue from resignation to possibilities. Klerk was the white president who stepped down and Nelson Mandela was the first black president. Here is a picture showing them both receiving the Nobel Peace Prize.

The reason for their success was that a year before the election, one group of people invited all the leaders from both white and black categories, in all businesses and professions, to have a one-week workshop. They wanted to look at what are the possibilities for the future of South Africa, no matter which government was in charge. They had four scenarios.

One was the ostrich: the white segregationist government that just sticks its head in the sand and doesn't care what happens. The second is the lame duck, the transitional government who'd be paralyzed. The third one is Icarus: It's a Greek story about an artist father who created wings out of wax for his son Icarus so they could fly out of the surrounded city. Icarus flew too high, despite warnings from his father, and his waxwings melted from the sun. In this case, Icarus symbolizes the black government taking over with a big spending program that would not sustain and which would make the whole country go down.

The last scenario is the flamingo. A key characteristic of flamingos is they take off slowly but take off together. This means forming a participatory coalition in order to get the whole country out of stalemate.

The nice thing about this workshop is they repeated it throughout the country for a hundred times. Most of the people in the country understood what they were talking about

洛斯卻不顧父親的警告越飛越高離太陽太近，臘翼因而被太陽的高溫融化。這表示黑人政府接管了政府，進行開銷龐大的計畫卻無力維持，整個國家也因此走下坡。

最後一種就是火鶴現象。火鶴的一個重要特徵就是起飛速度慢，但是牠們會整群起飛。這意味著大家共同合作組織一個聯盟，讓整個國家得以走出僵局。

這個研討會很棒的地方是，他們在全國各地重複進行了一百次會談。全國多數人都能明白他們所說過渡時期將有的狀況。這個實驗相當成功，因為它是跨領域思維：歸納的這些狀況考慮到了社會、政治、經濟和國際因素。它還具有參與性，因為各種不同行業的領導人都投身其中，並進行上百場的交流。第三，它是有急迫性的，如果他們什麼都不做，這個國家就會垮掉。

從這個南非實驗所得到的心得是，要接受相互依存的世界觀。基本要點是，要接受相互依存的世界觀——一種講求同體、合作和夥伴關係的跨界思維。

回到我的第一點，跨界思維的本質就是放下自我設限，進而看到一個充滿各種可能性的世界。就像上人說的，「他非即我非，同體名大悲。」不要分別對待他人，要與所有人融為一體。在你的旅途中，可能會遇到瓶頸，當你退一步看，就會發現，其實有條路可以到達目的地。

我忘了提到，在這個討論之後，我試想誰是第一個跨界思維者。我想，佛陀是第一個跨界思維者，因為他說「一切唯心造」。

in their transition. This experiment was successful because it was transdisciplinary: the scenarios took into consideration social, political, economic and international matters. It was also participatory because it involved all leaders from all walks of life. They had gone through it a hundred times. Thirdly, it's emergent, because if they didn't do anything, the whole country would collapse.

The lesson from the South African experiment was to embrace the interdependent worldview.

The basic key is to embrace an interdependent worldview. We need to broaden out from our bottom-level thinking of everything is about me to one that works with others—a transdisciplinary thinking which talks about oneness, cooperation and partnership.

Going back to my first point, the essence of transdisciplinary thinking basically is letting go of self-limiting assumptions in order to see a world of possibilities. Like the Master said, "The faults of others are my own, to be one with all living beings is great compassion." [Don't differentiate others and be one with everyone]. On your journey, you might hit dead ends, but when you take a step back and look, you'll see that there's actually a path to get to your goals.

I forgot to mention that I was looking at who was the first transdisciplinary thinker after I've gone through this discussion, and I think Buddha is the first transdisciplinary thinker because he said everything is created by the mind.

三藩市這個流行性感冒還沒有過去，那麼所有的人最好不要喝涼水，不要吃生的東西，不要吃沙拉。這個喝牛奶啊，也把它燒燒、滾了它，再喝比較好一點。多喝粥，多喝水，就把這種毒解過去了。還有大陸出的「銀翹解毒片」，那個藥品很有功效的。它本來說一次吃四片，那麼在你病比較嚴重一點的時候，可以吃八片，最多的時候，吃十二片。那麼這個病就會減輕的。

—摘自宣公上人《華嚴經淺釋》世主妙嚴品第一 • 沙彌尼近本 英譯

The flu season is not yet over in San Francisco. It is best that everyone not drink cold water or consume raw foods, such as salads. For those that drink milk, it would be better to boil it before drinking. Consume more porridge and water as they will dissolve toxins. The medicine from China *Yin Qiao Jie Du Pian* is very effective. The recommended dosage is four pills at a time, but your condition is more serious, you can take eight pills at a time. The maximum dosage is twelve pills at a time. This will lessen the symptoms.

—An Excerpt from "Chapter 1—The Wondrous Adornments of World Rulers" of *The Avatamsaka Sutra with Commentary* by Venerable Master Hsuan Hua • English Translated by Shramanerika Jin Ben